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More Informative Costs on the Income Statement

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One of the most recent voices to be raised in approval of direct costing, the author of this article points out that the conventional income statement misses the opportunity of reporting both marginal and net income, an opportunity which inheres in accounting data reflecting operations. Variable and fixed costs are redefined to controllable and capacity cost for statement purposes.

WE MAY FIND IT STRESSED by some that the income statement with which all are familiar rests on the underlying accounting process. If this is a significant statement, it ignores the matter of techniques. It is true that we cannot use information in an accounting statement which is not made available by he accounting system. Nevertheless, although we are thus bound by the methods and techniques by which accounting data are recorded and analyzed, we must not lose sight of the fact that methods and techniques exist for ultimate objectives, realization of which they may limit at any particular stage of development. We must state and know our objectives so so that we may be on the alert to develop the techniques that we have toward fuller realization of the objectives sought to be obtained.

Based on the foregoing as a premise, this paper will attack the sacredness of the traditional income statement not with the thought that it is to be disposed of once and for all, but merely to give it a "mid-term examination" in the light of changing methods and ideas. This "mid-term examination" will consist of one question: Would the income statement be more useful to management if the primary classification of costs and expenses were based on a distinction between those which are variable and those which are fixed?

THE XYZ COMPANY

INCOME STATEMENT

JANUARY 1, 1950 to DECEMBER 31, 1950

Sales		$ 1,051,900
Controllable costs		
Manufacturing costs applied to product (Exhibit 2)	$ 399,150	
Manufacturing costs unabsorbed (Exhibit 3)	3,000	
Distribution costs (Exhibit *)	150,330	
General and administrative costs (Exhibit *)	109,506	
(All standard price and quantity variance, if any)		661,936
Marginal income		$ 389,914
Capacity costs applied to product		
Manufacturing costs (Exhibit 2)	$ 126,800	
Distribution costs (Exhibit *)	100,000	
General and administrative costs (Exhibit *)	100,000	326,800
Net operating income		$ 63,114
Unabsorbed capacity costs		
Manufacturing (Exhibit 3)		32,000
Net income before taxes on net income		$ 31,114
Taxes on net income		12,000
Net income		$ 19,114

*Similar in form to Exhibit 3

EXHIBIT 1

The question cannot be disposed of by saying that variable and fixed costs can be analyzed in separate cost reports. So can any other classification or analysis of costs. The income statement includes the initial presentation of a company's cost experience for a particular period and should contain that classification of costs which is most informative and least subject to misleading interpretations.

There is evidence that cost accountants believe an inconsistency exists between the way in which costs appear to behave in statements and reports, and the way

in which they do behave. In "The Cost Forum," *N.A.C.A. Bulletin,* February, 1950, T. R. Elsman writes:

> "The allocation of fixed costs to units of product is necessary for financial accounting purposes so that inventory valuations can be determined. . . . It is doubtful if the allocation of fixed costs to products, branches, etc. is necessary for any other purposes. . . . He (the cost accountant) will finally conclude that the most useful figures he can prepare for management requirements should not contain elements of fixed costs which cannot be directly allocated."

In "Cost Accounting," *Contemporary Accounting* (American Institute of Accountants, 1945), Harry E. Howell states:

> "Cost information . . . often does not have a great deal of influence in price determination. Among the reasons for the failure to use this information may be listed: (1) The failure to make studies of costs apportioned and allocated on some other theory than casual responsibility. . . . (2) Failure to set apart the cost of idle facilities and organization. . . ."

It would seem that the crux of the matter lies in the allocation of fixed costs to product, which is necessary for the determination of inventories but may be misleading when presented to management as a basis for making decisions such as what to manufacture, what to sell, and how much and when.

THE XYZ COMPANY

STATEMENT OF MANUFACTURING COST OF GOODS PRODUCED AND SOLD

JANUARY 1, 1950 to DECEMBER 31, 1950

	In process 1-1-50	1950 charges	In process 12-31-50	Manufacturing cost of goods produced	Finished goods 1-1-50	Finished goods 12-31-50	Manufacturing cost of goods sold
Controllable costs:							
Direct materials	$ 9,000	$151,000	$ 10,000	$ 150,000	$ 12,300	$ 9,640	$ 152,660
Direct labor	12,000	213,000	15,000	210,000	16,000	13,000	213,000
Indirect controllable Manufacturing costs	1,700	34,000(1)	2,550	33,150	1,700	1,360	33,490
Total (to Exhibit 1)	$22,700	$398,000	$ 27,550	$ 393,150	$ 30,000	$ 24,000	$ 399,150
Capacity costs: (to Exhibit 1)	6,400	128,000(2)	9,600	124,800	10,000	8,000	126,800
Total costs	$29,100	$526,000	$ 37,150	$ 517,950	$ 40,000	$ 32,000	$ 525,950

(1) Budgeted amount at 80% of capacity as shown in Exhibits 3 and 4.
(2) See Exhibit 3.

EXHIBIT 2

Presenting Costs in Order of Controllability

In order to illustrate what an income statement might look like, and the problems involved, if costs and expenses were allocated on the basis of their variability with volume, Exhibits 1 through 4 are presented. In the Income Statement, Exhibit 1, costs and expenses are applied against revenues in the

THE XYZ COMPANY

FLEXIBLE BUDGET OF INDIRECT MANUFACTURING COSTS

Applicable to the Year Ending DECEMBER 31, 1950

	60% of normal capacity	80% of normal capacity	Normal capacity	Practical capacity
Volume expressed in terms of direct labor hours	120,000	160,000	200,000	250,000
Controllable costs				
Variable	$ 12,000	$ 16,000	$ 20,000	$ 25,000
Variable element of semi-variable costs	16,000	18,000	20,000	22,000
Total	$ 28,000	$ 34,000	$ 40,000	$ 47,000
Rate per direct labor hour at per cent of capacity level	.2333	.2125	.2000	.1880
Capacity costs				
Fixed element of semi-variable costs	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Fixed costs	140,000	140,000	140,000	140,000
Total	$160,000	$160,000	$160,000	$160,000
Rate per direct labor hour at normal capacity	.8000	.8000	.8000	.8000
	$188,000	$194,000	$200,000	$207,000
Total costs				
Rate per direct labor hour to apply to product (sum of rates above)	1.0333	1.0125	1.0000	.9880

EXHIBIT 3

order of their controllability. In the Statement of Manufacturing Cost of Goods Produced, Exhibit 2, fixed costs are allocated between inventories and cost of goods sold. Thus, the requirement of allocating costs against the revenues to which they apply is met and the inventories for the balance sheet include their share of all costs.

In constructing Exhibit 1 on the newer basis, the terms "controllable costs"

THE XYZ COMPANY

SCHEDULE OF INDIRECT MANUFACTURING COSTS

JANUARY 1, 1950 to DECEMBER 31, 1950

(Volume of operations for year: 160,000 direct labor hours -- equal to 80% of normal capacity of 200,000 direct labor hours)

	Actual	Budget	Actual Over under budget
Controllable costs:			
Itemized	$	$	$
Total (to Exhibits 1 and 2)	$ 37,000	$ 34,000	$ 3,000
Capacity costs:			
Itemized	$	$	$
Totals	$160,000	$160,000	$ -
Applied to product, 160.000 direct labor hours @ $.80 (to Exhibit 2)		$128,000	
Idle capacity, 40,000 direct labor hours @ $.80 (to Exhibit 1)		32,000	
Total above		$160,000	

EXHIBIT 4

and "capacity costs" have been used in place of "variable costs" and "fixed costs," respectively. The reasons for this will appear as exposition of the proposed statement progresses. Because it is felt that there is no generally accepted distinction between the words, "costs" and "expenses," the former is used throughout for simplicity's sake.

The income statement here offered shows the application against revenues, first of those controllable costs which are a direct result of the sales effort of the year. Controllable manufacturing costs in goods sold ($399,150) is

included from Exhibit 2. The excess of indirect controllable manufacturing costs over the amount of those costs applied to product ($3,000) is taken from Exhibit 3, Schedule of Indirect Manufacturing Costs.

The balance of revenues after deduction of these and other controllable costs is called marginal income. This item ($389,914) represents the amount available to meet capacity costs. While the capacity costs cannot be controlled readily, neither do they, for the most part, have to be paid for out of current earnings. Capacity costs applied to product ($326,800) include manufacturing costs of $126,800 forwarded from Exhibit 2. Exhibits similar to Exhibit 3 would support both distribution and general and administrative costs forwarded to controllable costs and capacity costs in the income statement, though such exhibits are not shown here.

The net operating income ($63,114) is the amount of revenues over and above the controllable costs and the portion of the capacity costs applicable to operating capacity used. It is the net income on the portion of capacity actually utilized. Unabsorbed capacity costs ($32,000) are shown as a separate caption but could be included under a caption such as other deductions. In the present illustration, these costs include only manufacturing costs, but distribution and general and administrative capacity costs could be allocated between utilized and non-utilized in similar fashion if the techniques can be developed to so measure them.

Since capacity costs are by their nature "joint" costs to all or many operations, their allocation to product in Exhibit 2 and to unabsorbed capacity costs in Exhibit 1 is necessarily made on arbitrary bases. In order for the allocations to be interpreted properly, the bases for allocation must be known and are presented in Exhibits 3 and 4.

The income statement presented can be expanded horizontally (or supported by supplementary schedules) as follows:

	PRODUCT, DEPARTMENT OR BRANCH					
	Total	A	B	C	D	Etc.
Sales	$	$	$	$	$	$
Controllable costs						
Marginal income	$	$	$	$	$	$
Capacity costs applied to product (or other cost unit)						
Net operating income	$	$	$	$	$	$
Unabsorbed capacity costs						
Net income before taxes on net income	$					

In a form like the above marginal income represents for each cost unit the amount which would be lost were that cost unit discontinued. Likewise, net operating income represents the relative ability of each cost unit to absorb its "share" of the fixed costs.

Supporting Schedules to the Income Statement

Exhibit 2 breaks manufacturing costs down to classification of direct materials, direct labor, indirect controllable manufacturing costs and capacity costs and this breakdown is applied to inventories of work-in-process and finished goods and is applied also to cost of goods produced and cost of goods sold. This schedule affords the tie-in between balance sheet inventories (opening and closing) and operations for the period as shown by the proposed income statement, in which inventoryable costs are included in several cost categories. If the indicated analysis is not practicable for the finished goods inventory column and hence for cost of goods sold column, a simple segregation to controllable and capacity costs will suffice for support of Exhibit 1.

Actual performance against budget or standard performance of the factory is compared in Exhibit 2 in two ways. The Flexible Budget of Indirect Manufacturing Costs, Exhibit 4, indicates that, at 80 per cent of normal capacity, $34,000 of controllable indirect manufacturing costs should be applied against product, and this is forwarded to Exhibit 3. There a difference between budget and actual of $3,000 is shown and reflects unfavorable performance. The capacity costs from Exhibit 4 are $160,000 for all levels of performance. This amount likewise is forwarded to Exhibit 3 and compared with the amounts accrued or expended. The portion of the $160,000 applied against product and the portion charged against revenues as idle capacity costs is computed to support Exhibits 1 and 2 and to give management complete information with respect to the basis of apportionment.

In the construction of Exhibit 4, the controllable costs are divided among direct labor hours at each level of operations. This results in a more or less constant rate per direct labor hour and per unit of product and also results in the application of these costs in a total amount approximately equal to the actual expenditures.

Regardless of the level of utilized capacity considered, the capacity costs are divided by the number of direct labor hours at the normal capacity level. This is established as 200,000 hours. There results a constant rate of $.80 per direct labor hour and, since direct labor hours is a variable base, the capacity costs are applied to product as a variable cost. However, the difference between

the amount applied to product and the total fixed amount of $160,000 is to be accounted for as the idle capacity cost or else as saving effected through operating at better than normal capacity. Exhibit 3 shows that during 1949 the XYZ Company operated at 80 per cent of normal capacity. Therefore, only 160,000 hours at $.80 were applied to product ($128,000) and 40,000 hours at $.80 ($32,000) are recorded as unabsorbed capacity costs on the income statement, Exhibit 1.

Re-Defining Fixed and Variable Costs

To properly evaluate in its entirety the illustration embodied in the exhibited income statement and its three supporting exhibits, some inquiry into the nature of the distinction between so-called variable and fixed costs should be made. The reasons for distinguishing between them might be summarized as follows:

1. To more accurately apply costs to product and so better control inventories and apportion expenditures against revenues.
2. To more accurately set expense standards and compare actual with standard performance.
3. To assist in determining sales policies and coordinating these policies wth manufacturing policies.

If the allocation of costs between those which are fixed and those which are variable is to assist in achieving broad objectives like these, the rules by which the two are distinguished must be such as to result in the most useful information. To say that fixed costs are those which do not vary with changes in the volume of operations and that variable costs are those which do, is not enough. Some fixed costs may be made to vary with volume by accounting methods, though the nature of the cost item is still the same. Depreciation on the straight-line method is probably the basic fixed cost. On the production method it becomes a variable cost on the records at least. A confusion between operating capacity and capacity utilized is at the root of this divergence.

Such apparent changes in category are unsettling to those who would establish a segregation which may be relied on as a management tool. The truth is that operating capacity "fixes" costs when it is considered that some of the most important decisions which management must make, involve the proper utilization of this operating capacity, both manufacturing and distributing, it becomes plain that the distinction between the capacity which is available and that which is actually used, should not be hidden by an accounting practice or manner of speaking. It would seem most useful to consider fixed costs as those accruing to facilities which are available, whether we use them or not. Thus the "fixed costs" would be better termed "capacity costs." This accords with the desire to define items by nature rather than by the way they are handled on the books of account.

Most discussions of fixed and variable expenses express the idea of controlla-

bility. Perhaps this is the heart of the problem because the fact that variable expenses are readily controlled and fixed expenses are not is really what makes them variable or fixed with relation to the level of operations. In other words, fixed expenses are really those which cannot be made to vary with changes in volume. By inference, variable costs are in the opposite condition. Hence, a better term than "variable costs" might be "controllable costs."

Any concept of fixed or variable costs must be related to a reasonable period of time. If controllability of costs is the deciding factor, there are few costs which can be variable over a very short period of time, such as a week or a day. Almost the entire cost structure is a standby expense with respect to very small fluctuations in volume. On the same basis, there are no costs which are fixed over a very long period of time, because entire plants can be built or abandoned if management is given a sufficient amount of time in which to do so. It is suggested that variable and fixed expenses are considered most often as those which either are or are not subject to management control over a period of one year and that, unless otherwise stated, this should be understood in any definitions.

Within the period of one year, many costs are subject to very direct control by management, making them variable. Others are subject to no control whatsoever, making them fixed. It is only natural that there should lie between these two extremes many cost items which are subject to control only with changes in volume which are pronounced and which are nevertheless contemplated within any one year. These are the so-called semivariable expenses.

Consistent with the foregoing remarks, variable, fixed and semivariable costs may be defined as follows:

1. Variable costs are those which are within such direct control of management that they can be readily made to vary with changes in volume within the period of one year. They might better be termed "controllable costs."
2. Fixed costs are those which, by the nature of the service or benefit they represent, are contingent upon the passage of time rather than a level of operations. They are, in the normal course of operations, not subject to management control over a period of one year. They are really costs of maintaining a certain capacity and may better be called "capacity costs."
3. Semivariable costs are those which contain a fixed element which is a "capacity cost" and a variable element which, in any one-year period, is a "controllable cost."

Presumptions and Purposes of Cost Classification

In addition to the foregoing, any particular budget of fixed and variable expenses must be based (as noted in NACA Research Series No. 16, June 15, 1949) on certain conditions which are predictable at the time the budget is made. These are:

1. The existence throughout the year, with no major changes, of a certain plant and organization.
2. The efficiency with which that plant and organization can be used.
3. The methods with which the capacity will be utilized.
4. The prices of the cost factors.

We have seen that classification of costs between those which are variable and those which are fixed is essentially a classification between those which are readily controllable by management and those which can be controlled only over a long period of time. It is therefore particularly useful in presenting data which shows:

1. Management's degree of success in maintaining a satisfactory margin between sales prices and those costs which may be directly related to the items sold, i.e., the controllable costs.
2. Management's degree of success in maintaining a volume of sales of profitable lines sufficient to absorb the capacity costs.
3. The actual effect on current income of long-range plans which give rise to capacity costs.

This information is not only of historical significance but it is vital in making plans for the future. It may be used as the basis for estimating the probable effect of the elimination or addition of a product or branch, or the substitution of one for another, or the advisability of changes in selling prices. It may be used to determine where to place additional sales effort or where costs must be reduced. It may be used to estimate the results on a company's profits of the erection of a new plant, or the abandonment of one already in use.

A New Order of Costs for the Income Statement

There is nothing in the traditional form of the income statement to even hint at most of the problems just enumerated, much less assist in their solution. A form of income statement such as is illustrated in Exhibit 1 would ensure the classification of accounting data between fixed and variable costs and would give such classification a place in the reporting level which would make certain of attention to it for small businesses as well as those large ones which have adequate cost reporting.

An income statement of this type might also be very useful to those who advocate expressing financial statements in common dollars. Since controllable costs represent recent expenditures, they are expressed in the same kinds of dollars as are revenue. Capacity costs, on the other hand, represent largely apportionments of expenditures made when the value of the dollar was quite different from its range of values over the period covered by the income statement.

The Art and the Science of Distribution Costing

by JOHN A. BECKETT

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The accompanying article discusses distribution cost control, directed to assisting execution of current plans on a responsibility basis, and distribution cost analysis directed to aiding the choice by management of future courses of action. These are presented as the twin tasks of distribution cost accounting and as the science and the art, respectively, of this area of accounting endeavor. Attention is also given to the relative merits of so-called marginal and complete costs for the purposes of cost analysis.

IT HAS OFTEN BEEN SAID that the trouble with distribution costing is that it is not practiced enough. There are few who will deny the truth of this. In many companies very little use, if any, has been made of the tools and techniques of distribution costing and even in companies in which the practice has been developed to a relatively high degree, it is apparent that only a beginning has been made. That this is so has suggested to some observers that distribution costing represents the next great field of endeavor for the cost accountant. Indeed, the belief has crystallized so thoroughly that a speaker or writer on the subject is more or less expected to introduce it with the assertion that all must now turn loose their talents upon this troublesome and unsolved problem.

Distribution Costing Up to Now

Of course a good many accountants and others have been attending to the details of distribution costs for many years and have devised approaches and analyses which have been used in genuine and frequently successful efforts to analyze and control distribution costs. Yet among perhaps a majority of accountants and businessmen, there persists a tendency to avoid the subject or at least to pay less heed to it than to other areas of cost accounting. This is unfortunate because careful analysis of distribution costs often leads to discoveries which are of real significance to profits. There is evidence that a good many companies have effected substantial savings and have enhanced their profits considerably as a result of concerted efforts to direct distributions activities in the most appropriate channels and to carry them out with maximum efficiency. Even when no immediate and dramatic financial advantages can be shown to have resulted from distribution costing, the very act of studying this aspect of the life of a business provides the base upon which future experience can be judged. Since

it is a maxim of accounting that a thorough understanding of cost behavior is prerequisite to the establishment of goals and "pars" to be used by those who are expected to direct the course of the enterprise, it goes without saying that the alert and competent accountant cannot long neglect the subject of distribution cost analysis.

Contrary to common belief, there exists a fairly substantial backlog of source material available to those who may wish to use it. Contributions have been made by leading authors in texts devoted exclusively to the subject. Periodic articles of signal usefulness have been prepared by the U. S. Department of Commerce and by other agencies. A good many practitioners have faithfully recorded their thoughts, experiences, and techniques. Others have prepared useful case studies for the assistance of those who may be or wish to become concerned. However, this published material offers a variety of theories and methods which sometimes seem more to confound the subject of distribution costing than to clarify it. And in addition to the wide variety of viewpoints thus offered in writing may be mentioned the absence of unanimity in business practice. It would appear, therefore, that a synthesis of theory and practice might be attempted anew with some hope that progress in distribution costing will result.

In such an effort, it will obviously be impracticable to report upon different theories or methods which have been propounded. Rather, an effort will be made to chart a clear course through the unfamiliar waters of distribution costing, using tools which the industrial accountant will instantly recognize and concepts in which he is already well-versed. In short, an attempt will here be made to apply fundamental accounting theory and methods to a subject which has become clouded by a wide variety of techniques and a fair amount of conflicting theory.

Distribution Costs are not a Residual Group

It is common practice to divide all business costs into two main categories, production and distribution, and to use this classification as a tool for isolating the one and excluding the other when undertaking a study of particular aspects of cost. Many an author has used this classification as a primary and natural division of all costs, for the purpose of narrowing the field of analysis and homogenizing the statistical subject matter of study. As a tool for thinking about distribution costs, such a broad division has its uses. It helps to bring into focus the area of costs which is of first concern to the distribution cost analyst at the moment. However, such a division of costs also has its dangers.

For one thing, there appear to exist in present-day business life some costs which are production and/or distribution costs only in the very broadest and long-range sense. In the second place, it is very difficult in many cases, to make the cutoff between production and distribution costs. In some instances it is impossible and undesirable to do so because of the interrelationship which exists between them.

As the first point, it may be said that some costs are related to production and/or distribution so generally or in such a remote way that it is well to isolate them in our thinking for separate consideration. The cost of pensions is an example. The relationship of these costs to current production and distribution exists but is quite distant. Payments made to institutions and universities by various companies "to promote and improve the general economic climate for free enterprise," represent another example of these remote costs. While such payments are deemed to be necessary expenditures by socially conscious business managements, they scarcely bear a demonstrable relationship to current productive and distributive business activities. If, perhaps, these costs do not deserve to be characterized as a new category of business costs, they, and others like them, must be recognized as not bearing with the same instancy on production and distribution activities. For present purposes, this is to say that distribution costs cannot be defined as all costs which are not production costs.

On the second point, there is the matter of whether and when production and distribution costs may be considered without reference to each other. The interrelationship between the functions of production and distribution is very real in its effects. Alteration of distribution policies can seldom be considered alone. If revised methods contemplate volume, packaging, handling, or other changes in the so-called area of production, the question of their desirability hinges upon the total effect which such a change entails. Distribution cost accounting is not, then, concerned only with the costs which, in chronological order, succeed the point of inventory. Whenever changes in distribution policy are contemplated, any effects which such a change will have on plant operations must be known before the proposal can be appraised realistically.

There is a Science and an Art

However, although definitions of distribution costs may not be entirely easy, the practices which are called distribution costing are not difficult to identify. There are two broad areas of activity for the distribution cost accountant. As with the corresponding phases of production cost accounting, these areas are quite separate. One is concerned with the uses of costs for *cost control purposes.*

The other is concerned with the uses of costs for the purpose of *discovering more effective ways of doing things*. The first pertains to people and their successes in performing their tasks according to plan, i.e., responsibility accounting. The second pertains to appraisals of present policies of management and to projections of proposed changes. In the factory, the cost control problem involves the use of budgets and standards for material, labor, and other costs. The factory counterpart of the "policy and change" area concerns "make or buy" problems and the necessity of selecting costs with great care and projecting them into the future to find the most favorable course of action for the period ahead.

To restate the foregoing for the emphasis it deserves, distribution costing may be, and is, looked upon in two ways. First of all, it involves the control of costs which are caused by the performing of certain necessary functions, such as persuading the customer to buy, delivering to him, and collecting from him. The costs of doing such things are subject to some degree of prediction and control. The functionalization of these costs and their control through the use of familiar techniques, is the initial problem of distribution costing. Secondly, distribution costing is concerned with the search for opportunities to improve the profit picture through the exposure of areas of relative strength and weakness. Here, it is concerned with pointing out those activities which are productive of profits and those which are not. It involves exploration into the effects which will be produced by changes in distribution policy and it is dedicated to the proposition that a company should know what sorts of things it does best and should do only those things.

It is in these two major divisions of distribution costing that the elements of science and art are separately discerned. There are those who, upon recognizing the objective of the second area of distribution costing, the area in which reliance upon method is tenuous and the necessity for wisdom is great, deny that it is accounting at all. They assert that the breadth of the approach takes it out of this classification. It is indeed a very broad function, but the study of such opportunities has customarily been associated with distribution costing and it will be so treated here. The remainder of this paper, then, will be devoted to two principal—and different—aspects of distribution costing.

1. The control of distribution costs (the *science* of distribution costing) wherein distribution costs are viewed in a restricted sense as being comprised of present costs which succeed the point of inventory.

2. The analysis of distribution costs (the *art* of distribution costing) wherein a broader view of distribution costs is taken for purposes of studying future opportunities through knowledge of the relative value and comparative desirability of alternative courses of action.

Techniques of Control Apply to Distribution Functions

The functions comprising the task of distribution are variously discerned and described. In the pertinent literature, many different ways of organizing distribution cost functions are suggested. At least one author lists as many as fifty-nine separate distribution functions. The functions which are included in the table below are therefore intended to be suggestive only:

SKELETON FUNCTIONALIZATION OF DISTRIBUTION

MAKING THE SALE	HANDLING THE GOODS	COLLECTING FROM THE CUSTOMER
1. Advertising.	1. Pre-sale handling.	1. Credit review.
2. Selling.	2. Storing.	2. Credit granting.
	3. Packing.	3. Collecting costs.
	4. Shipping.	
	5. Transportation.	
	6. Delivery.	
	7. Return transportation.	
	8. Return handling.	

The technique used here of dividing a large activity into a number of smaller homogeneous activities is a familiar one to the cost accountant. He uses it continually in factory costing. He breaks up the manufacturing job into numerous classifications of responsibility, such as purchasing, receiving, storing, protecting, handling, maintaining, providing power, assembling products, and so on. He works with such portions of the whole in studying cost behavior, in setting standards of performance (determining expectations), and in measuring cost experience. Such functionalization of costs provides the basis for using cost accounting as a tool for aiding all members of the management team from top to bottom to understand their respective responsibilities and to manage them with maximum effectiveness. So it is with distribution cost control. Some of the functions are just as sensitive to the familiar tools of cost control, budgets and standards, as are the functions of manufacturing.

This is particularly true of the two broad functions of handling the goods and collecting from the customer. Many of the related subfunctions are capable of being routinized. They usually represent the responsibilities of individuals whose performance records may be judged by comparisons of actual costs with budget figures. They even lend themselves readily in many cases to standardization and measurement by number of units of work performed, such as product units packed, weight or bulk of items handled, number of line items shipped, or number of credit lines traced to files. In a good many instances when these distribution activities take place under the same roof as the factory, they are neglected because they do not fall under the purview of the factory cost analyst.

Yet the application of cost control principles to such activities has been made to produce substantial improvements and marked savings when the cost controller's talents have been directed to them.

The third broad function, making the sale, will also benefit from like treatment, though to a different degree. Accountants have never been willing to concede that the selling function is one over which no control can be exercised. There are budgets for sales activities just as there are budgets for collection and delivery activities. Admittedly this function of business is carried out more loosely as to routine than other activities, but that fact does not justify an abandonment of all efforts to measure the performance of individuals against budgeted allowances and to control costs accordingly.

Cost Control in Distribution An Adaptable Process

An example of budgets and standards in operation in the field of distribution costs is found in the case of a large food wholesaling company which operates a truck line for transporting its own goods from place to place. Costs of operating the line are budgeted as closely as they would be if the truck line were a separate company. Fees for transporting products from one city to another are charged to the company division to which the transportation service is rendered, on the basis of the published or bid rates of competing truck lines and the difference between actual and "standard" (competitive) cost of the service is credited back monthly to the divisions to which the charges were made. That this difference *is* a credit is largely due to the technique, itself, under which there is continuous measurement of performance against the realistic standards of the operations of others, enabling the company not only to promote and maintain efficiency in its trucking activities but also to judge the desirability of continuing in the trucking business at all.

There are numerous familiar examples of the standardization of other distribution functions, such as handling, storing, packing, shipping, and credit and collection activities. Most businesses have standards of varying degrees of perfection for activities of these sorts and are able at least to compare their performance against reasonable expectations based on studies of the work to be done in the several functions.

Of course, standards and budgets are not always formalized "on the books" for continuous and automatic revelation of a company's experience in regard to specific distribution functions. Just as is the case with some aspects of production accounting, it is sometimes impracticable to do so. Alert management requires and responds to all sorts of measurements, some of which, of necessity, must be

made on the basis of careful periodic "off-the-books" study of different cost situations. Such is the case of a large manufacturing company which stores substantial quantities of inventory at various places throughout the United States. In some localities the company owns its own warehouses whose managements are encouraged to bid competitively for the business. In localities where public warehouse space is used, the company's own cost experience in operating warehouses in similar localities for similar volumes of inventory is carefully reviewed and compared every three months with charges made by the outside warehouse.

In short, there is nothing new or different—to this point at least—in the problems of cost accounting and cost control as they pertain to the broad function of distribution. Just as the functions of production are standardized, routinized, and measured, so too a substantial number of functions of distribution may be standardized, routinized, and measured. They may involve activities under the same roof as the factory or at opposite ends of the earth, but they are usually susceptible of measurement against pre-defined goals of cost behavior. One of the products of such measurement is a clearer understanding of the relative success attending the efforts of different members of the management team to do their jobs well in accordance with the predicted cost patterns to which they have subscribed.

The Promising Field of Distribution Cost Analysis

It has been the course of this paper so far to omit from the distribution cost category certain nonmanufacturing costs deemed to be, after a fashion, remote costs and to represent distribution costs proper as an area to which cost accounting has particular applicability as a science and an art. In the paragraphs which precede this, it has been shown that the science of cost control, as it has come to be applied in the factory (in the immediate applications there is art), can be carried through to most distribution functions as well. The twin tools of budgets and standards appear to be as useful in distribution cost control as in production cost control in spite of the practical difficulties which are involved. We are now to go further and explore the art of distribution cost *analysis* and attempt to discern its goals and its applicability to practical business situations.

Distribution cost analysis is essentially a search for better ways of doing things. It is an accounting approach conceived for the purpose of casting some light on such questions as may be exemplified in the query, "What things are we doing which are most or least effective?" It is an effort to identify the sheep and the goats among customers, products, districts, order sizes, and many other segments of business activity. This is a different process from distribution cost

control (although it cannot be denied that it involves "control" in the broader sense). It is not concerned with the setting of cost pars or goals and the current direction of business activities. It is concerned, rather, with efforts to discover the areas of greatest promise in the future through study of the relative desirability of different things which are being done at present.

The future with which distribution cost analysis is concerned is differently conceived from the future in budgets and standards. The latter are concerned with planning the costs of doing what has been agreed will be done and controlling the costs of so doing, as times goes along. However, distribution cost analysis is aimed at: (1) discovering the "big brothers" and the "weak sisters" of present business activities and (2) predicting the total effect which the expansion of some and the contraction of the other would produce. The distinction is important because the two approaches call for different techniques. Distribution cost control involves the application of the principles of budgeting and standards to functional costs which a company plans to have. Distribution cost analysis is concerned primarily with discovering weak spots in the distribution policy and predicting the effect which would be produced by the elimination of such "defects" and the concentration of greater effort upon the more lucrative aspects of business.

Product Net Profit or Contributed Margin?

Those who undertake to discover through cost analysis, in line with the foregoing, the relative weakness or strength of different business activities and the effect of policy changes, find that there are two divergent "schools of thought" as to how such cost work should be done. On the one hand, there are those who feel that all costs which bear a relationship to the units in question should be assigned to them for purposes of measuring their profitability. On the other hand, there are those who deny that there is any such thing as profitability by units and who feel that measuring the contribution of each unit to the body of fixed costs which exists for the common benefit of all is the only really reliable way to discover the strong and the weak elements of business activity. The merits of these two positions (each of which is strongly attacked by its adversaries and defended by its advocates) must be carefully analyzed if the theory and practice of distribution cost analysis are to be understood.

Let us suppose that an effort is being made to test the relative strength of a company's sales districts. Those who espouse the former point of view would assign all or almost all of the costs which the company sustains, so that all sales districts would carry on an equitable basis the entire company cost of doing

business. The advocates of this point of view are persuaded that each unit (in this case, each sales district) must bear its share of costs in addition to its own direct costs. They point out that the sales district does not exist alone as a separate business activity but that it depends for its existence upon other activities of the business, the costs of which are therefore charged to it on the most equitable and reasonable bases which the accountant can select. Those who present this case argue that a good many of the costs are capable of being assigned to the unit (sales district) on the basis of demonstrable cost relationships and that, even when the costs must be prorated (where the relationship is quite remote), the basis is still a reasonable one. It is the reasonableness, not the rightness, which counts in the eyes of the proponents of this view, because the cost analyst is looking only for an indication of comparative strength or weakness among a number of homogeneous units. They feel there is merit in computing a "net profit" by units because in the long run, each unit must produce profits computed on some reasonable and realistic basis.

The opposing view is quite different. Its advocates prefer to use only the costs which are directly attributable to the unit in question. In the present case the field costs of the districts and the inventory costs of the merchandise which is sold through those districts would be the attributable costs. There is no "raining down of costs from above" on the segments of business under study. Such costs are regarded indirect to the units in question, inasmuch as they would not contract or disappear as the unit—the sales district—was contracted or eliminated if it were found to be one of the least desirable. It is further asserted that any effort to allocate or prorate costs indicates a confusion of purposes, a carry-over from profit-measurement accounting into the area of alternative courses of action. Those who so contend prefer to concern themselves with a measurement of the contribution which each unit makes to the common pool of fixed costs which exist for the benefit of all such units, believing that, in the last analysis, profit by units is a dangerous and misleading concept.

Strangely enough, it would seem that each of these theories can be used to good advantage by the distribution cost analyst, even though they are opposed in concept and different in substance. On behalf of the former (or full cost) point of view, these points may be made on the example given. If sales districts are credited with their respective revenues and charged with all direct and indirect costs (with exceptions noted) in a cost exploration aimed at determining the relative desirability of all the company's sales districts, the measurement may be a very valuable guide to management in focussing attention upon an area which, by comparison, calls for improvement. Costs have been assigned to

the districts in the manner in which management wishes them to be borne and any units which have failed to carry their share are fit subjects for concentrated managerial attention.

What is more, nobody needs to feel that there is any error in concept just because this method of appraisal does not at the same time show what results one should expect if the unit were to be expanded, contracted, or even eliminated. Those who perform this sort of cost analysis with their eyes open know that this is not a picture of cost behavior and that it would be exceedingly dangerous to take revolutionary action on the basis of its findings. Yet they may benefit from it, nevertheless, by knowing that, on the basis of the manner in which they would like joint costs to be borne, one or more sales districts is not carrying its share of the load. When that fact has been ascertained, different kinds of remedial action may be studied as a second step in the process of finding better ways to do business.

On the other hand, the advocates of the "contribution" theory of distribution cost analysis follow a practice which has great appeal. They concern themselves with direct costs, that is, those which vary with the variation in the activity being studies and disappear if the activity is discontinued. They often call these "escapable" costs and point out that, when one limits oneself to consideration of such costs—even though they may be few when any particular unit is being considered—there is at once disclosed the unit which has comparatively the poorest (or best) showing and an indication is given of the effect which would be produced by expanding, contracting, or discontinuing that unit.

This is very convenient. It kills two birds with one stone, and incidentally often indicates, by the size of the "contribution" made by direct margin, the alarmingly large proportion of costs which are common (joint facility) to many units and, therefore, cannot be considered with regard to each. Moreover, basing judgment on marginal contribution almost certainly precludes the error of discontinuing a unit the revenues of which exceed its out-of-pocket costs. Perhaps this is the one great advantage of the method. Using this approach, it is difficult to be misled into action which would worsen the situation for a company as a whole by causing the elimination of marginal items.

Both ways of looking at the situation seem valid if they are interpreted properly. If separate segments of a business are to be viewed coldly with regard to their ability to produce profits, the full cost method has real value. However, somewhat the same picture of comparative desirability can be obtained through the direct cost approach which, in addition, provides a picture of the cost implications doing things differently.

Of course, it would be erroneous to report that the practice of distribution cost analysis is clearly divided between the two opposing camps whose theories have just been presented. There are means to these extremes. It is important to note extremes, however, in order to appraise and understand practices encountered and to develop one's own philosophy for distribution cost analysis.

Revelations of the Distribution Cost Analysis Spectrum

It is helpful to note the broad scope of the subject matter of distribution cost analysis because it offers a pattern about which some useful generalizations can be made. A list, illustrative of this scope, is shown below. Analysis may be by:

1. Products.
2. Product groups (size or number of units).
3. Product lines.
4. Product divisions (if company is organized along "product lines").
5. Marketing outlets.
6. Territories.
7. District.
8. Salesmen.
9. Classes of customer.
10. Size of orders.
11. Customers.

Clearly these are but some of the analyses which can be made. Others have been recommended and tried in the practice of distribution costing. Clearly also, a number of these analyses are appropriate to the problems of some companies and not others. Yet they serve to illustrate the types of analyses which are contemplated in this discussion and—what is more important—they indicate the important "pattern" to which reference was made above.

It is to be noted that the types of analyses at the beginning and end of the list are specific, while the items between are progressively more general as they approach the center. The items in the earlier part of the list have *product* characteristics while those in the latter part have *customer* characteristics. This list may be called the *spectrum of distribution cost analysis* and its important features may be more clearly presented in the elongated bell chart shown as Exhibit 1.

This chart may prove to be helpful in recognizing the applicability of the approaches to distribution cost analysis which have been discussed up to this point. For example, studies of individual products or individual customers (both of which are on the extreme ends of the chart) are destined to reveal that there are, in the final analysis, very few costs which can be assigned directly to such specific items. The more general the segments become, the more costs will be found to be direct as to them.

This is another way of saying that the direct cost approach—the second of the two approaches to distribution cost analysis which have already been presented—

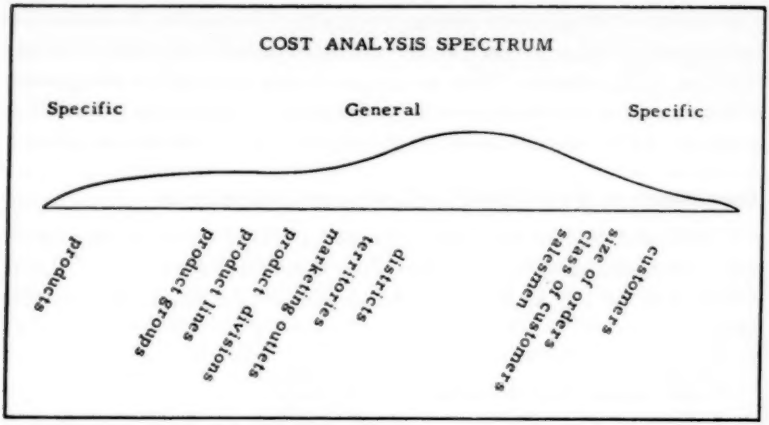

EXHIBIT 1

suffers from serious practical limitations when applied to the segments toward the extremes of the spectrum. The costs which are truly direct as to these specific segments are so few that the "contribution" is almost the size of the gross revenue. As the segments become more general, i.e., as we approach the center of the chart from either extreme, the number of direct costs which pertain to the segment increases in number and significance. Hence, the usefulness of direct costing results increases. Such would be the case in the analysis of the costs of sales territories, the subject matter about which our illustrations of both the full cost and direct cost approaches was built. Here may be the reason for the inclination among some distribution cost analysts to employ the technique of allocating and prorating costs to such specific segments as products and customers. When the segment under study is of a more general nature, the search for direct costs (to apply to the segment) is more fruitful, and the inclination to allocate and prorate is consequently much more easily overcome.

Light on the Relative Merits of Full and Direct Costing

The wide differences of opinion which have prevailed with regard to the theory of distribution cost analysis tend to cast a cloud over this whole subject. Yet there need not be real confusion. There are just two techniques of cost analysis, each of which has its strong and weak points.

The allocation-proration or full cost technique has the advantage of being helpful where the direct cost technique is weak, that is, at the extremes of the

spectrum where the units are specific and the direct costs are few. Furthermore, the technique is realistic in that it assesses to units their fair share of indirect costs so that when they are all compared, one against the other, to determine the relative worth of each, the bases of judging may be mature and complete bases which have real meaning in the long-run.

A disadvantage of this technique is that the results may be mistaken for indications of the action which should be taken to correct poor showings by certain units which are being studied. Whether this is a serious objection or not depends entirely upon the comprehension by the cost analyst of the nature of costs and their behavior. It is certainly true that some very grave mistakes have been made when the second step—exploration into the effects of changing policy—has been omitted, but the literature of distribution costing sounds this warning again and again. Moreover, good straight thinking on the part of the analyst will preclude the error anyhow.

The real practical strength of the full cost approach lies in its usefulness as a tool for guiding decisions so that gradual changes may be made. If a unit is weak (as compared to its sister units of the same segment), this approach indicates that fact. The ensuing managerial action usually takes the form of an attempt to build strength where weakness is found, and that takes time. It is not commonly necessary, therefore, as a practical matter, to carry the cost analysis to the second phase. If Territory No. 15 is doing poorly as compared to other like territories, the fact is important to know and the knowledge will normally stimulate investigations to find out why, including inquiry as to how the territory can be built up. Comparatively weak units must be weak indeed if they are to be considered for guillotine treatment. Ordinarily, the action indicated is less drastic. Usually it is evolutionary rather than revolutionary.

This strength of the full cost method of distribution cost analysis is, in turn, a weakness, for it is strength built upon practical expediency. It is a trading upon the law of averages. The analyst who belongs to the direct costing camp is deeply fearful that opportunities to improve the welfare of the company as a whole will be missed because of failure to measure *each* alternative by the direct cost approach, whether or not excision is contemplated. The appeal of the direct cost technique lies in its spelling-out of the expected behavior of costs under assumed conditions. Although its primary objectives are to measure the contribution of units to common costs and to permit a comparison of those units with one another, the by-product of such an analysis (because of the use of escapable costs) is an indication of the results which would be obtained by expansion, contraction, or elimination of the units. Under certain conditions this

is very valuable information. Hence arises its popularity among distribution cost analysts.

Direct costing has this further advantage: it points out, or should, the interrelationship between production costs and distribution costs and indicates not only the fact that certain changes will have production implications but also the extent of such implications. This is not automatic, of course, but when the technique used requires one to deal with alternative courses of action, the mind is more likely to be drawn to the effects which such changes will cause across the board, than if other techniques were employed.

It would appear, then, that distribution cost analysis remains an art in which care and skill, rare judgment and keen insight are needed. There are wholly different concepts to draw from and each may be used with caution. There are no rules for finding one's way to the magic answer, nor will there ever be in distribution cost analysis. It is an area of many pitfalls and hazards but, like most situations in which the risk is great, the area is one of promise and opportunity for great gain.

A Newer Use for Developed Skills

Thus it is that distribution costing appears to be divisible into two skills, the skill of measuring the success with which people are conducting their assigned responsibilities and the skill of interpreting various groups of data for the purpose of testing the effectiveness of present ways of doing things and of discovering better ways of doing them. Both of these skills present the same kinds of problems as are found in the factory. The first skill is one the industrial accountant uses every business day in preparing budgets, participating in setting standards, and promoting effective cost control through the device of management by exceptions. The second skill is one which the industrial accountant is called upon to use in connection with appraisals of prospective alternative courses of action in the factory. It is the area of so-called "managerial uses" of costs. It honors no method or technique but calls for clear understanding of the behavior of costs and knowledge of how they would be affected by various changes.

Both approaches, as applied to distribution costing, are necessary to enlightened business management because it is not only necessary to do well what we have, as businessmen, set ourselves to do, but it is clearly desirable to know what kinds of things we do best. The accountant who can assist in the accomplishment of these objectives will prove his worth to business over and over again, and nowhere is this opportunity more evident than in the relatively undeveloped field of distribution costing.

Distribution Cost Control — And Beyond

by E. W. KELLEY

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The myriad ways in which marketing costs are incurred render their control and the selection of methods by which the related functions are performed, a matter of expertly combining theory with practice. The author of this article, whose company encounters an exceptionally wide range of marketing problems, offers examples of cost control reporting procedures keyed also to cost analysis needs.

THE PROGRAM OF COST CONTROL and cost analysis, whether in manufacturing or distribution depends upon the improvement of reliable means for measuring operation. The control of manufacturing operation automatically controls product costs. This same maxim is true with the control of marketing operation. However, little has been done to apply to distribution costs the techniques commonly used to control manufacturing costs. If the same pattern of control is followed as in manufacturing, a manager of marketing would first make his plan, secondly, set the standards based on this plan, thirdly, measure performance and match it against the standards and, lastly, check the plan to see that it has been a good one.

There Are Two Fields

Thus cost accounting for distribution should deal with problems falling into two areas corresponding to related but separate processes:

1. **For cost control, the problems that arise in measuring the efficiency of operations.**
2. **For cost analysis, the problems involved in comparing the present method of distribution with other possible methods.**

Cost control of marketing operations is the measurement of an activity against a goal or a standard. Management has already determined the marketing method. Cost control measures performance in the execution of the prescribed method and indicates appropriate action to correct unfavorable deviations. Analysis of marketing operations is the study of the present method of distribution in comparison with all other possible methods. Such analyses are used to determine the most effective pattern of marketing policy for management to follow.

The least work has been devoted to what would seem to be the most important phase in the control of distribution costs. This is the measurement of efficiency at the process level, i.e., the cost control of individual distribution operations. The problem is more difficult in the field of distribution than in manufacturing because of the lack of repetitiveness and the lack of consistency in distribution operations. Most phases of marketing do not take place under assembly-line conditions. As a result, businessmen have not been able to find as reliable standards for distribution as exist in their manufacturing operations.

It's Different With Distribution

Production personnel have gone a long way toward standardizing operations and processes without relating them to a purpose. Companies manufacturing automobiles and companies manufacturing tractors can be guided by the same standards of performance for castings, sheet metal, etc. Like things and like processes are put together. First the processes are standardized as to material and method, and then the people are fitted into the pattern indicated.

These steps are difficult to apply to marketing. Here, well-planned methods will not necessarily shape up in visible results. A "perfect" sales technique may yield no sales. A small advertisement may pull better than a large one. Sales call time is not reliably related to orders. Transportation is a field of many choices and its alter ego, proper customer service, is an even less definite matter. Thus, one salesman, one market, one means of transportation, one product (in its distribution characteristics) is never so like another that controls by processes can be accepted by themselves in marketing cost control.

What then is the needed ingredient to establish a method of control for these costs? In distribution control is centered, not just on processes for which people may be made responsible but on the essentially independent exercise of functions. The distinction is important. Alter the wording ever so little and the application still seems to be the same as to production costs, for here too, centers of responsibility vest in persons. However, the product, itself, provides a check point. In marketing, the entirety of control centers about the assignment and exercise of responsibility.

It would seem that this situation makes standards of lower potential with respect to distribution costs. The incorporation of cost standards in the accounts for marketing is usually not advisable because of the frequently changing factors in the distribution processes. Moreover, the need does not exist to show standards in the accounts for inventory valuation. Hence it seems more advisable to record

the actual costs in the accounts and compare these with budgets and statistical standards. This method of cost control permits the weighing of marketing operations on a current basis without the formal recording of standards in the accounts.

Elements of Marketing Cost Control

Therefore, the prerequisites of an accounting plan for marketing which will provide information for cost control purposes are that there be:

1. A system of responsibility accounting for distribution operations.
2. Statement of functions of each responsibility.
3. Decision as to the size of the operating unit for which accounting is to be made.
4. Provision for the necessary natural accounts to correctly catalogue the costs for each function.

These four steps dovetail. In establishing the system called for by the first step, the operations to be accounted for must be examined in detail as to flow of products as well as of transactions. From this the various functions for each of the responsibilities in the distribution system are determined to fulfill the second step. The term, function, in marketing may be compared with the term, cost center, as used in manufacturing. In establishing the functions, it is necessary to decide the size of the operating unit as called for by the third step. The natural accounts needed in each of our functions, as required by the fourth step, will depend on the variety and volume of transactions encountered.

Under an accounting plan so developed, there will be provided a complete and adequate recording of actual marketing costs. To accomplish cost control from this point involves measuring these actual costs for the functions of each operating unit against the (preferably) off-the-books standards already mentioned. Statistical standards or pars set should be attainable by the marketing personnel. Methods of establishment of these standards will be illustrated in several of the examples applicable both to cost control and cost analysis given later in this paper. The paragraphs which immediately follow stress the nature of, and certain critical areas in, distribution cost control.

The Service Responsibilities in Marketing

The processes of marketing require service functions accessory to the more direct functions in the same way that manufacturing does. Management often considers it more efficient to operate these services as separate responsibilities. This is particularly true when the service is rendered to more than one sales responsibility. A warehouse may be operated for several sales divisions, an automobile fleet may be used by different sales departments, and one accounting

department is likely to handle the sales and distribution expenses for the entire company.

The cost of operating each of these service responsibilities may be materially affected by changes in the selling methods. The number of warehouses required will be influenced by the average size of an order, which in turn is influenced by the type of customer sold. The accounting costs, such as billing and collection, are also affected by sales methods and policies. Especially does the size of the market sold reflect itself in every service responsibility and function. Even when the distribution methods remain in status quo, the demands and wishes of individual sales personnel affect the cost of sales service.

When management decides that, for operating purposes, these common functions should be organized under service responsibilities, it necessarily follows that they must be accounted for as such. This creates the need for charging the other sales responsibilities for these services. The most satisfactory basis is to follow the usage principle, i.e., to charge each responsibility for its participation in a service. If this is effectively done, it can be an extremely important step in a distribution accounting plan because it inevitably leads beyond the measurement of present usage to the consideration of alternative methods and their possible benefits.

Control Methods for Advertising and Sales Promotion Costs

Of all the responsibilities and functions, the most difficult to measure for efficiency and effectiveness are advertising and sales promotion. It is practically impossible to isolate all other variable factors to determine the accomplishments of these two responsibilities. Quite often the questions are heard, "How can you tell how effective your advertising program is?" and "How do you know that some other methods might not be more effective?"

As accountants we do not have to admit defeat on this problem. We cannot judge it on as factual a basis as some other marketing costs. However, much valuable information can be developed regularly. One way of doing this is to determine sales volume in a market before and after an advertising or sales promotion campaign. If this information is needed regularly, it can be incorporated into the regular accounting plan.

Such reporting should be on the basis of booked orders because many factors make the flow of orders differ from shipments. In this way the selling results can be compared with budgets which reflect the goals of sales promotion management. Share-of-the-market statistics will also provide some measure of the

productivity of an advertising or sales promotion campaign. Comparisons on a local or national basis can be made before and after the campaign.

COST ANALYSIS OF MARKETING OPERATIONS

It is time now to turn to the second accounting aspect of distribution costs, that of analysis. It forms a field of wide general interest. The problems which it poses are equally significant whether an integrated marketing system exists or whether other agencies are used to distribute the product. All companies should certainly be interested in the study and review of distribution segments to expose the locations of strengths and weaknesses. The interest is especially appropriate applied to the potentials of other marketing methods and the reframing of marketing operations from many points of view. However, surveys have shown that many companies do not look beyond their own net sales in the analysis of marketing costs. This is obviously a mistake and a short-sighted point of view.

Much material is available on the analysis phase of distribution cost accounting, However, most of it is confined to the implications of historical costs and the relative merits of various methods of handling joint costs. Comparison of the relative costs of individual segments of the company's distribution outlay is usually a part of the process. The more important matter of the effect on the total distribution picture of alternate methods for the same segment has been neglected. Such studies require a complete assignment of costs. The analysis may look toward choice of methods of distribution, choice of markets, choice of customers, etc. It provides the eyes for management to determine its marketing policy.

What is the best way of going about comparing different methods of distribution? First, it is necessary to discover the principal difficulties faced and, second, to attempt to define what would happen under other possible and feasible methods. Third comes the choice of the best method from the point of view of cost and service—not always how little the cost but often how much the service or how effective the job. Finally there is the follow through and measurement of actual accomplishments against estimated accomplishments.

BASIC REPORTING FOR MARKETING COST CONTROL AND ANALYSIS

Many techniques have been devised for use in accounting for marketing costs. The present section of this article is devoted to illustrations of both cost control and analysis. The examples are drawn from the experience of several companies.

Trial Balance of District Selling Expenses

SELLING EXPENSES — Page 3 — District - A — Month - October, 19__ — Responsibility Name - XYZ

Account	Account No.	Last Year Actual	This Year Actual	This Year Budget	This Year Over (Under)
Payroll - Supervision	3101	$ 2,125	$ 2,275	$ 2,300	($ 25)
" - Route Salesman	3102	23,492	22,944	22,450	494
" - Selling Representatives	3103	12,631	12,949	13,300	(351)
" - Sales Servicemen	3104	810	850	850	-
" - Sales Incentive Wages	3215	1,179	2,907	3,100	(193)
" - Overtime Premium	3220				
" - Other Compensation	3225		204		204
" - Termination Allowance	3240				
TOTAL PAYROLL		40,237	42,129	42,000	129
Payroll Overhead	3300	3,219	4,193	4,176	17
Supplies for Customers	4191	1,019	922	975	(53)
Commissions & Brokers Fees	6107				
Telephone & Telegraph	6320	997	1,648	1,340	308
Company Meetings	6410	741	329	400	(71)
Sales Convention Expense	6414				
Traveling Expense	6450	8,152	8,626	8,200	426
Inv. Adjust. (Spoilage & Write-down)	6600	473	192	325	(133)
Contributions	6711	260	300	300	
Memberships, Dues & Subscriptions	6712				
Expense Not Otherwise Specified	6735	1,987	1,776	1,850	(74)
Bad Accounts - Charged Off	6750	1,423	727	1,200	(473)
Samples	6774	985	809	900	(91)
Sundry Receipts & Credits	6820				
Taxes & Licenses	7600	89	113	100	13
Transfers - General	7980				
TOTAL - ROUTE AND DIRECT		59,582	61,764	61,766	(2)
Service Chg. - Regional Sales	8979	853	888	900	(12)
Service Chg. - Automobiles	8950	11,364	10,499	11,130	(631)
" " - Warehousing	8960	8,921	7,926	7,527	399
" " - Premises	8961	8,111	7,640	7,693	(53)
" " - Admin. & Clerical	8970	16,224	14,967	14,682	285
" " - Sales Acctg. & Credit	8974	5,157	4,617	4,291	326
SUB-TOTAL - OPERATING, ACCTG. CHARGES		49,777	45,649	45,323	326
GRAND TOTAL FIELD SELLING		110,212	108,301	107,989	312

EXHIBIT 1

Selling Expenses in the Field

Exhibit 1 is a trial balance of selling expense for a district. This exhibit is a regular accounting report and illustrates cost control through the use of budgets, a sales incentive plan, and the recording of service charges from other responsibilities. In this instance the basic operating unit is the sales district.

The responsibility shown is the X Y Z Sales Division. The company may and probably does have other sales divisions operating within the territory covered by this district. These serve for comparison. A comparison incorporated in the report is afforded by expenses for the similar period of the previous year. Explanations from each district sales manager of deviations from the budgeted amounts, are required as a regular operating procedure.

SPACE OCCUPANCY ANALYSIS

Section 1
DISTRICT: A District
AREA
LOCATION (nearest)
DATE | PREPARED BY

Section 2

LINE	TOTAL AVAILABLE SPACE	ACTUAL SQ. FT.	SQ. FT. ADJUSTED BY WEIGHTING FACTOR	FROM LINE	SUMMARY DIVISION A SQ. FT.	SUMMARY DIVISION B SQ. FT.
1	OFFICE SPACE (AREA)	2,012	3,622	13 or 17	3,622	
2	OFFICE SPACE (DISTRICT, REGION, ACCTG.)	8,539	15,370	SUM 2A	8,607	6,763
3	GARAGE SPACE	12,444	12,444	33	12,444	
4	WAREHOUSE SPACE	9,434	9,434	39	3,300	6,134
5	TOTAL AVAILABLE SPACE	32,429	XXX	XX	XXX	XXX
6	TOTAL ADJUSTED SPACE	XXX	40,870	XX	27,973	12,897
7	PERCENTAGE DISTRIBUTION OF LINE 6 ABOVE	XXX	100%	XX	68.4	31.6

Section 3

LINE	PERCENTAGE CALCULATIONS	TOTAL	DIVISION A NO.	DIVISION A %	DIVISION B NO.	DIVISION B %
8	CLERICAL MAN HOURS (SCHEDULE 1)			100		

NOTE: USE PERCENTAGE CALCULATED ON LINE 8 TO DISTRIBUTE TOTAL SPACE ON LINE 5 TO DIVISION A AND DIVISION B.

Section 4

LINE	AREA OFFICE SPACE	TOTAL SQ. FT.	DIVISION A %	DIVISION A SQ. FT.	DIVISION B %	DIVISION B SQ. FT.
9	CLERICAL (USE % FROM LINE 8)					
10	AREA MANAGER	-	XX		XX	
11	SALES REPRESENTATIVES		XX		XX	
12	ROUTE SALESMEN		XX		XX	
13	TOTAL LINES 9 - 12 INCL.					
14	AISLE AND OTHER GENERAL SPACE (USE % FROM LINE 13 TO DISTRIBUTE TOTAL TO EACH DIVISION)					
15	TOTAL AREA OFFICE SPACE	2,012	100	2,012		
16	SPACE COST WEIGHTING FACTOR	1.8	XX	1.8	XX	
17	ADJUSTED OFFICE SPACE (LINE 15 X LINE 16)	3,622	100	3,622		

Section 5

LINE	GARAGE SPACE	TOTAL SQ. FT.	DIVISION A %	DIVISION A SQ. FT.	DIVISION B %	DIVISION B SQ. FT.
18	PASSENGER CARS	80	XX	80	XX	
19	TRUCKS	11,004	XX	11,004	XX	
20	MAINTENANCE	960	100	960		
21	TOTAL LINES 18 - 20 INCL.	12,044	100	12,004		
22	AISLE AND OTHER GENERAL SPACE (USE % FROM LINE 21 TO DISTRIBUTE TOTAL TO EACH DIVISION)	400	100	400		
23	TOTAL AREA GARAGE SPACE (SAME AS TOTAL ON LINE 21)	12,444	100	12,444		

Section 6 Complete Sections 6 and 7 before Section 8

LINE	WAREHOUSE SPACE	TOTAL SQ. FT.	DIVISION A %	DIVISION A SQ. FT.	DIVISION B %	DIVISION B SQ. FT.
24	REFRIGERATED SPACE - LOW	752	100	752	-	-
25	REFRIGERATED SPACE - NORMAL	760	28.4	210	71.6	530
26	NON-REFRIGERATED SPACE	1,985	21.7	431	78.3	1,554
27	TOTAL LINES 24 - 26 INCL.	3,477	60.1	1,393	59.9	2,084
28	AISLE AND OTHER GENERAL SPACE (USE % FROM LINE 27 TO DISTRIBUTE TOTAL TO EACH DIVISION)	2,160	-	384	-	1,776
29	TOTAL WAREHOUSE SPACE (SAME AS TOTAL ON LINE 4)	9,434	35.0	3,300	65.0	6,134

NOTE: LUNCH ROOMS, STATIONERY AND ARCHIVE STORAGE AREAS, OFFICE REST ROOMS AND ENTRANCE FOYERS SHOULD BE CONSIDERED OFFICE SPACE (LINES 1 OR 2 AND LINE 14). BOILER ROOMS AND STAIRWAYS SHOULD BE OMITTED.

EXHIBIT 2

Into Space

On the trial balance for selling expense, the service charges for automobiles, warehousing, etc., come from other functions in the sales operating responsibility. These operating functions may serve several districts and selling responsibilities. The Space Occupancy Analysis, Exhibit 2, shows the manner in which a premises function can be service-charged to a direct selling responsibility. It shows, in the various sections, the usage of office, garage and warehouse premises made by the sales responsibility. To charge office space (which is more expensive than the others), it is necessary to go beyond simple area allocation and to weight the several sections of a structure in accordance with relative cost to build and to assign building service costs on a weighted basis. The analysis of the location

TRANSPORTATION EXPENSE STATISTICAL REPORT

DISTRICT: A District
MONTH - YEAR: August 19

UNIT	PRODUCT GROUPS	PLANT TO WAREHOUSE			PLANT TO CUSTOMER			INTRA SALES		WAREHOUSE TO CUSTOMER		TOTAL	TRANSP. COST OF MONTHS SALES		
		GROSS WEIGHT	AMOUNT	COST CWT.	GROSS WEIGHT	AMOUNT	COST CWT.	GROSS WEIGHT	AMOUNT	GROSS WEIGHT	AMOUNT	GROSS WEIGHT	AMOUNT		COST CWT.
	COLUMN NO.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	CALCULATION			(2 ÷ 1)			(5 ÷ 4)					(2+5+8+10)		((12 - 4) x 3 ÷ 2+5+8+10)	(13 ÷ 11)
1															
2	SALT	3,410	65.08	1.90	12,142	190.12	1.52	21,392	142.07	51,822	370.20	787.41	26,686	1,811.41	2.51
3	LEAVENERS	49,784	660.53	1.32				84,338	556.38	15,343	109.65	996.56	97,799	1,051.68	1.17
4	DOUGH IMPROVERS	188,325	2,471.61	1.31				31,477	201.84	119,599	854.14	1,111.61	104,791	1,258.09	2.25
5	FROZEN EGGS	250,176	930.46	.37				319,024	862.31	1,534	10.96	1,795.63	152,839	1,796.65	.71
6	FROZEN FRUIT	25,110	251.15	1.00				24,773	165.77	960	6.86	423.82	26,048	433.11	.67
7	COFFEE - INSTITUTIONAL	192,134	1,496.67	.77				302	1.34	1,472	11.96	1,509.97	222,639	1,521.62	.79
8	" - FROZEN EXTRACT	2,525	96.95	3.83	750	16.20	2.16	185	1.28			114.43	3,936	122.54	3.12
9	TEA BALLS AND BAGS	1,500	16.65	1.11				1,523	8.99	63	.45	26.06	1,773	193.18	6.12
10	GELATIN - INSTITUTIONAL	9,850	233.68	2.37				4,930	34.50	1,106	7.91	276.09	9,202	260.50	2.83
11	PUDDING - INSTITUTIONAL	8,925	197.19	2.20				1,604	10.46	226	1.90	209.55	4,209	108.96	2.50
12	BAKER'S MARGARINE	238,430	305.80	.13				6,201	22.05	29,521	210.97	538.82	51,832	305.54	.59
13	SHORTENING	231,337	1,556.76	.68	60,896	470.90	.77	39,593	254.97	743,112	5,095.90	9,770.53	826,570	9,487.40	1.15
14															
15															
16	COFFEE - GROCERS	138,980	511.75	.37	68,143	138.17	.66			641,860	4,296.05	5,268.97	712,004	5,506.85	.77
17	" - INSTANT	1,500	382.10	25.48						7,533	50.17	432.27	7,527	391.67	5.20
18	TEA - PACKAGES	800	23.32	2.91						3,083	20.53	43.85	3,970	209.87	5.28
19	" - BALLS GROCER	10,000	285.92	2.85				1,116	8.24	3,492	23.26	317.42	3,473	130.14	3.74
20	" - INSTANT			2.62											
21	GELATIN - SMALL			1.91						30,783	205.08	205.08	30,716	784.68	2.57
22	PUDDING - SMALL	14,125	267.81	1.90				14,938	114.62	35,014	233.26	1,215.72	34,946	1,012.23	2.89
23	BAKING POWDER			1.38											
24	MARGARINE - 1 LB.	425,572	7,369.63	1.73	272,623	2,149.40	.78			378,093	2,518.85	12,030.88	441,977	11,085.67	1.72
25	BUTTER - 1 LB.			1.84											
26	DRESSING AND SPREADS	37,223	30.36	.08	213,930	1,296.88	.60			67,253	448.04	1,775.28	259,313	1,773.23	.71
27	CHEESE	143,044	2,219.08	1.55						155,708	1,037.33	3,256.41	153,115	3,430.61	2.22
28	TOMATO JUICES	144,232	2,069.07	1.35	40,096	585.40	1.46			140,424	935.63	3,587.90	130,220	3,438.47	2.62
29	CEREALS	72,036	1,087.71	1.51	20,142	328.31	1.63			81,744	544.59	1,960.61	101,886	2,107.32	2.07
30															
31															
32	SUB TOTAL - DIVISION B	1,336,412	14,869.81	XX	614,932	4,791.16	XX	17,084	122.86	1,547,683	10,310.66	30,094.49	2,120,959	29,600.98	XX
33	COST PER CWT.	XXX	XXX	1.11	XXX	XXX	.78	XXX	.7191	XXX	.6662	XXX	XXX	XXX	1.40
34	ERROR ADJUSTMENT	20,119	291.73		(20,119)	(291.73)									
35															
36	GRAND TOTAL	1,129,457	25,859.42	XX	668,901	5,176.65	XX	345,776	2,272.74	2,465,633	17,013.58	50,322.39	3,779,867	50,119.87	XX
37	COST PER CWT.	XXX	XXX		XXX	XXX		XXX		XXX		XXX	XXX	XXX	

EXHIBIT 3

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TRANSPORTATION COST WITH COMPANY OPERATED TRUCKS

A District - October, 1950

	Actual	Budget
Payroll - Truck Drivers	$1,962.42	$1,920.00
- Overtime Premium	129.13	120.00
- Other Compensation		
Total Payroll	2,091.55	2 040.00
Travel Expense	210.05	225.00
Equipment, Purchasing, Rentals and Service	12.98	15.00
Expense not otherwise specified	51.45	56.50
Transfers - Warehousing and Trucking	399.99	421.00
- General	100.00	100.00
Service Charge - Automobiles	3,560.28	3,610.00
Total Trucking	$6,426.30	$6,467.50

	Division A	Division B	Division C	Total
Trucking Control, Fl. to Whse.	(1,983.80)	(310.92)		(2,294.72)
" " Fl. to Cust.	(297.06)	(529.93)		(826.99)
" " Intra Sales.	(75.10)			(75.10)
" " Whse. to Cust.	(262.87)	(826.14)		(1,089.01)
" " Division C			(2,140.48)	(2,140.48)
Total Trucking Costs	2,618.83	1,666.99	2,140.48	6,426.30
Comparable Common Carrier Costs	4,185.97	2,694.11	3,485.65	10,365.73
Gross Weights Hauled - Company Trucking	7,779.88	6,791.86	16,497.10	31,068.84

EXHIBIT 4

illustrated indicates that 68.4% of these costs should be charged against Division A.

On the whole, this method of handling service charges has the weakness of passing on to the selling responsibilities the inefficiencies of the service responsibility. However, there is also thus created a series of pressures from the responsibilities receiving the charge for an increase in service efficiencies. This gives an organization control which would not otherwise exist.

Costs of Product Movement

Cost of transportation is effectively controllable through the information provided by sound reporting procedures. Here is one of the major items of marketing expense, the cost of transporting finished goods from manufacturing to sales locations and to customers. The Transportation Expense Statistical Report, Exhibit 3, is an operating report which is produced from accounting records. Finished goods transportation is accounted for in four major categories:

1. Plant to warehouse.
2. Plant to customer.
3. Intra-sales.
4. Warehouse to customer.

The transportation accounting plan is primarily for the operating manager to use in the control of expense. However, transportation expense, as a service cost, is charged to sales divisions and product groups and the accounting is done for this purpose also. On the control side, the transportation expense statistical report enables a district operating manager and the transportation staff at headquarters to get a bird's eye view of what is going on without the work necessary to review hundreds and even thousands of freight bills. They are able to make comparisons of actual transportation costs with the standard cost of movements of every product to each sales district.

The hypothetical figures in Exhibit 3 may be used for typical questions which would be directed to the district operating manager so that he may take the appropriate control steps. The figures raise these questions in a simple and natural manner.

1. Shipments of only 16,000 pounds of malt from the plant, with sales of 76,000 pounds, indicates overstocking the previous month. Also, the rate from plant to warehouse is too high when compared with the statistical standard. Why were not these shipments combined with other products or with the plant to customer shipments to reduce the rate?
2. Shipment of 74,000 pounds of dough improvers from warehouse to warehouse seems unnecessary. Was the cost of $504 justified? Why were these shipments not made from the plant?
3. Why was a small shipment of tea balls made from the plant at the high cost of $4.87 per hundredweight. This rate is considerably above the standard. If the shipment was necessary, why was it not combined with other products from the same plant to get a lower rate?
4. The report shows 823,000 pounds of shortening shipped from plant to warehouse and 713,000 pounds from warehouse to customer. With this volume, why were not more shipments made direct from plant to customer?
5. Shipments of instant coffee from plant to warehouse should have been combined with other products in order to obtain a lower rate. The actual hundredweight cost of $4.54 compares with a standard of $2.35 when included in a combination load.
6. The high hundredweight costs of $.71 and $.67 for warehouse to customer shipments compare unfavorably with the standard rate. With the large volume lower costs are expected. With proper use of route layouts, contract carriers, etc., the average warehouse to customer cost would be $.55 and $.51 per hundredweight, respectively.

Special control problems exist in respect of company-owned trucks. Actual and budgeted operating expenses of company-operated trucks in District A, for a month period, are shown in Exhibit 4. The actual expenses of $6,426 compare with $6,467 planned expenses. Certain expense accounts in the automobile function, such as gasoline, are budgeted on a variable basis. The total actual over-the-road trucking costs are allocated to the various sales divisions by type of product movement.

It will be noted that common carrier costs for each division's movements are compared to the actual costs at the bottom of the report. A saving of approximately $3,900 is indicated on the figures used. This comparison provides a method of cost control which supplements the budgetary control.

COMPANY OPERATED WAREHOUSE COST COMPARISON
Monthly Average, Third Quarter, 19___

	Location A	Location B	Location C	Location D
Space Costs (Warehouse only)				
Refrigeration Supplies	$ 50.25	$ 280.64	$ 39.19	$ 20.23
Utilities	126.28	325.79	101.56	176.57
Repairs & Maintenance	52.46	351.75	97.07	5.15
Outside Services - Other	7.77	523.51	42.18	8.20
Depreciation	50.97	578.39	-	51.05
Amortization Leasehold Impr.	49.44	-	-	-
Rent	446.40	-	745.73	625.00
Taxes & Licenses (Real Estate Taxes only)	-	413.35	-	-
Total Average Monthly Space Cost	$ 791.72	$ 2,473.25	$ 1,025.68	$ 886.18
Average Monthly cwt. Received	6,309	17,000	7,413	12,352
Space Cost Per cwt.	.13	.15	.14	.07
Handling Costs				
Total Payroll	$ 1,157.82	$ 3,095.29	$ 725.04	$ 1,656.99
Overtime Premium	4.28	61.69	26.07	12.16
Payroll Overhead	55.46	222.08	28.12	115.17
Supplies - All other	18.70	100.10	67.71	26.35
Outside Services - Other	-	-	-	-
Charges on Shipments In & Out	.48	64.08	-	7.93
Expenses Not Otherwise Specified	-	-	-	-
Depreciation (Handling Equip.)	28.69	39.72	58.32	5.61
Total Average Monthly Handling Cost	$ 1,263.43	$ 3,582.96	$ 905.26	$ 1,824.17
Average Monthly cwt. Received	6,309	17,000	7,413	12,352
Handling Cost Per cwt.	.20	.21	.12	.15
Total Warehousing Cost Per cwt.	.33	.36	.26	.22
Total Average Monthly Warehouse Costs	$ 2,055.15	$ 6,056.21	$ 1,925.94	$ 2,710.35
Comparable Public Warehouse Costs	$ 2,008.15	$ 7,140.00	$ 4,442.81	$ 3,553.08
Inventory Adjustments	$ 14.53	$ 563.93	$ 78.62	$ 23.57

EXHIBIT 5

Product Stop-Over Costs

Warehouse operation is another special problem in the distribution cost field. The statement exemplified in Exhibit 5 compares the space and handling costs for four company-operated locations. It is for the use of the operating or sales service responsibility. It is true that space costs must be controlled at the time premises commitments are made. They then become fixed for the period of the

commitment. Comparisons of prospective cost per square foot with standards and with actuals for other locations, are made at time of acquisition.

However, an operating manager can be held responsible currently for space utilization. This is the reason comparison of space costs on the basis of weight of goods received is featured in the report. The relative space cost per hundredweight indicates space utilization. It may be stated (although it is not shown) that the cost per square foot of floor area for Location D is comparable with Location C. Since it is important only at the time the premises are acquired, the cost per square foot of floor area is not a part of this operating report. The hundredweight cost for space of $.07, indicated for Location D, illustrates good space utilization.

DISTRICT PROFIT AND LOSS BY PRODUCT
Sales Division Z
A District
Third Quarter 19

LINE NO.	PRODUCT	UNIT	NET SALES QUANTITY	NET SALES AMOUNT	GROSS MARGIN AMOUNT	TRANSPORTATION AMOUNT	ADVERTISING	SALES PROM.	MARGIN AFTER PRODUCT EXPENSE AMOUNT
1		(1) LB.	931,560	305,541	67,885	24,300	29,506	10,008	9,070
2		LB.	-	(412)	(412)	-	-	-	(412)
3		-	2,363,491	73,359	54,412	1,511	6,739	528	45,833
4		GAL.	-						
5	TOTAL		3,295,051	378,488	121,885	25,811	31,245	10,536	54,491
6		LB.	1,115,640	768,920	73,908	12,393	41,145	28,504	(8,094)
7		LB.	-						
8		LB.	69,182	113,372	51,583	1,420	22,157	7,625	382
9		LB.	27,933	13,988	7,760	384	597	1901	6,989
10									
11		LB.	-						
12		LB.	-						
13		CS.	28,795	87,657	36,716	3,317	6,767	9,277	17,354
14		CS.	44,924	130,450	63,267	5,837	20,101	528	29,810
15									
16		CS.	8,540	26,596	14,835	690	19,572	5,548	110,9771
17		LB.	48,803	46,910	12,242	807	2,707	1,094	7,635
18		LB.	120,239	229,437	76,971	3,657	13,034	5,267	55,012
19		LB.	9,683	18,981	7,447	315	10,594	89	(3,351)
20	TOTAL		-	1,430,315	324,731	28,755	144,475	57,744	93,,58
21	TOTAL DISTRICT		-	1,016,803	446,616	54,565	175,720	68,080	148,250

(1) - QUANTITY SALES

	LB.	271,656
	LB	22,392
	LB.	637,512
TOTAL	LB.	931,560

DISTRICT DIRECT SELLING EXPENSE	57,087	
DIST. SERV. CHGS. - OPERATING	32,216	
TOTAL DISTRICT SELLING EXPENSE	89,304	
DISTRICT PROFIT	58,946	
PERSONNEL:	1949	1950
SUPERVISION	4	5
SALES REPRESENTATIVES	34	32
TOTAL	38	37

EXHIBIT 6

The handling costs, as distinguished from space costs, shown in the second section of Exhibit 5, can be measured against standards which have been set by operating management. The type of handling equipment used in each instance must be considered in establishing the standard. It may be noted that Warehouse C has a lower hundredweight handling cost than any of the others. In fact, it is lower than for the warehouses with greater volume. In spite of this the cost may show up unfavorably when compared with a statistical standard of $1.12 for a

warehouse of this size with this type of handling equipment. (The statistical standard is not shown on this report.)

The total warehouse costs for Location B indicate poor space utilization and high cost handling. In spite of this, the location is operating at a cost less than public warehousing. On the other hand, public warehouse costs for Location A would be less than the company-operated warehouse costs. All of these matters receive the scrutiny of operating sales management and are followed for corrective action.

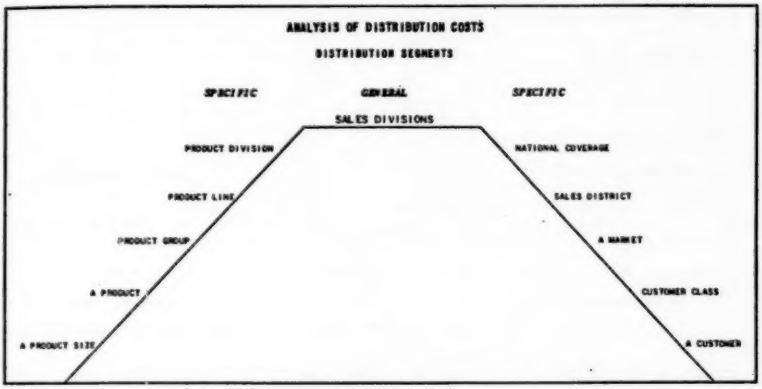

EXHIBIT 7

Has the Product Been Profitably Sold and Shipped?

The operating results for a sales district are displayed in typical profit and loss form in Exhibit 6. Product costs are accounted for on an actual basis by products as far as sales, gross margin, transportation, advertising and sales promotion are concerned. Selling, operating, and accounting expenses are shown in total for the district. These may be the costs of the district selling unit, itself, as well as service charges from other functions and responsibilities.

This report may be employed for budget comparisons. When used in this manner, it exemplifies cost control. However, its further purpose is to provide a starting point for research into potentials in the choice of methods of distribution, markets, customers, etc. It provides management with the results of the present method of distribution and also serves as the basis for reframing operations in terms of other possible methods. For certain uses, it will be sufficient to charge against products only direct expenses. For others a complete assignment of marketing costs will be necessary.

The nature of the markets in the district dictate the distribution method which should be used. Any projected improvements can be costed for each of the functions. Care should be exercised if results of one district are compared with another, so that unlike situations will be recognized.

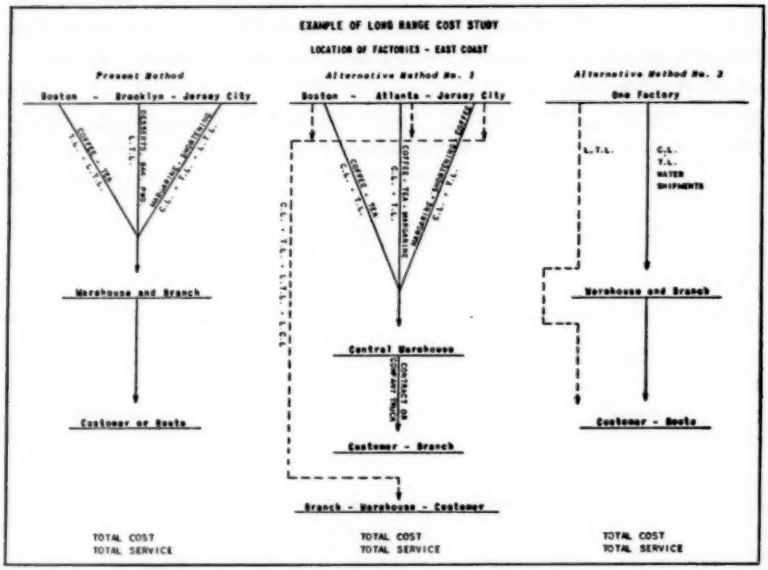

EXHIBIT 8

GOING ON TO DISTRIBUTION COST STUDIES

The chart form of Exhibit 7 depicts the various distribution segments which may be studied or analyzed. It will be observed that the more general the segment becomes, the more similar it gets to other segments. Cost problems grow more complicated as the segments studied become more specific.

An accounting plan largely directed to cost control can—as has been illustrated by the provisions for outside comparison, etc., in the forms exhibited—provide much basic information serviceable for special study or analysis. In other words, a study for choice of distribution methods, choice of markets, or choice of customers can start with basic and general information already provided in the regular accounting plan for marketing activities. It must be kept in mind that the goal in distribution cost analysis is to expose the sore spots in the distribution system and to indicate the potentials of alternative distribution patterns.

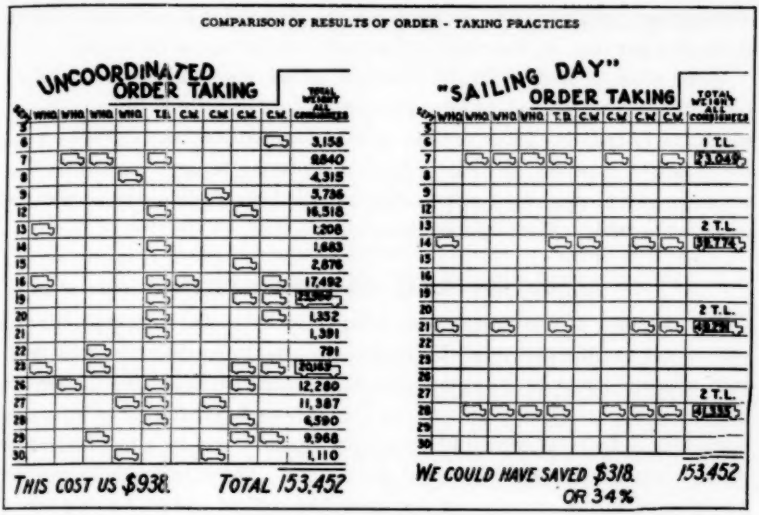

EXHIBIT 9

Two Schematic Examples

The scale which a cost study may take is attested to by Exhibit 8 in which a comparison between the present and two alternative methods of distribution for east coast markets is offered. This comparison is concerned with the location of plants and warehouses which will affect manufacturing as well as marketing costs. Various methods of transportation and warehousing are considered. Transportation media may be common, contract or company-operated carriers and shipments may be made in various size lots. The effect of combining product groups must be examined. In some instances certain selling and clerical costs are also a factor. The decisions will be made, not only on the basis of cost, but also on the service which will be given customers under the several alternatives.

Again, a special study or analysis is necessary to show the effect of and remedy for uncoordinated order-taking. Transportation statistical standards for cost control take into consideration the planned pattern of transportation. However, they do not disclose potential saving which coordinated or "sailing date" order-taking might make possible. Exhibit 9 portrays clearly in its lefthand portion that, during the month in question, merchandise was shipped every working day to the particular market. With what we call "sailing date" order taking, this

merchandise could have been shipped into the market for a potential saving of thirty-four per cent, as illustrated in the righthand portion of the exhibit.

Quite often it takes a display like this to get the cooperation of selling personnel in revising order-taking practice. Several companies have been very successful in realizing lower finished goods transportation costs through use of the principle involved. If "sailing date" order-taking becomes part of the distribution policy, then the transportation statistical standards must, in turn, be corrected to reflect a lower cost standard.

ACCOUNTING TOOLS FOR BETTER MARKETING

The purposes of this articles have been to spell out the difference between cost control and the analysis of distribution costs and to examine the problems of both with the intent of disclosing avenues of industrial accounting progress in the area of marketing activities. As has been indicated, cost control of marketing operations is the measurement of an activity against a goal or a standard where management has already determined the method. The objective is to measure performance in the execution of the prescribed method and to indicate appropriate action to correct unfavorable deviations. Analysis of marketing operations, on the other hand, is the study of the present method of distribution in comparison with other possible methods. Such analyses are used to determine the most effective pattern of marketing policy for management to follow.

The examples given have been related to both cost control and analysis because both are important. One supplements the other. Many improvements in accounting techniques are needed for both. However, much progress is being made. More is needed. Industrial accountants must increase their distribution accounting bills to provide better eyes for marketing management.

Performance Reports in a Tabulating Unit

by L. CHAUNCEY LEWAN

Assistant to the Comptroller, Weston Electrical Instrument Corp., Newark, N. J.

How much productive use of tabulating machine and operator time is secured and at what cost per hour on various jobs for departments served by the tabulating unit? This article, which opens with a quick review of scheduling problems, illustrates the methods employed by one company to control the productivity of the tabulating process.

To AMERICAN RESOURCEFULNESS add a dash of genius spurred by incentive and it will be found that almost anything is possible. This truism is quite apparent in the growth of mechanization in office routines. Especially have tabulating machines been a boon to administrative efficiency. However, it is here that certain administrative problems are likewise created which demand solution if the efficiency of operation is to be in fact realized. Planned control of the work is necessary.

The question of efficiency involves the effective use of men, material, space and time. The tabulating supervisor should constantly look for those methods which accomplish more work, give greater accuracy, or take less time. Perhaps the control of time is the nub of the whole matter. Effective use of time will determine, to a large extent, the efficiency of a tabulating installation. Moreover, operations must be scheduled if maximum efficiency is to be obtained.

Scheduling and Peak Loads

Scheduling may be considered first. It is the process of fitting job processes into a logical time table. The procedure and flow chart should show what paths must be followed. The schedule must show when the operations will take place. However, the very importance of proper scheduling suggests that there are obstacles which stand in the way of its achievement. There are definite scheduling problems caused by a wide variety of factors. The nine which follow are the ones most commonly encountered:

1. **Peak loads.**
2. **Break-down of equipment.**
3. **Absenteeism.**
4. **Holiday periods.**
5. **Re-runs.**
6. **Work received late.**
7. **Rush jobs.**
8. **Procedure changes.**
9. **New jobs.**

Of the foregoing, the obstacle of peak loads is recognizable as the one most damaging to schedule performance. In fact the other matters listed become important chiefly as they result in peak loads. The all too frequent remedy for peak loads consists of ordering more machines or working overtime. However, such loads can often be eliminated or reduced through one of the following methods based on study of the circumstances:

1. Reduce card volume by periodic summarization. Use the summary cards for writing the reports.
2. Change operation sequence to eliminate sorts where this can be done.
3. Interpret cards at the point in the procedure at which the work is least likely to bottleneck.
4. Reexamine cut-off dates.
5. Increase batch sizes where possible.
6. Combine information on several reports into one report.
7. Block-sort the cards to spread the work load through various types of equipment.
8. Reproduce a work deck and use it for a portion of the procedure so that two identical decks are processed simultaneously.
9. Combine operations, such as reproducing and gang punching, in a single run.

WORK PROGRESS CHART

TABULATING DEPT

GROUP

Name John Jones — Week Ending Oct. 3, 1950

TYPE OF WORK		MONDAY Hours Work	MONDAY Date or Type	MONDAY Cards Punch	TUESDAY Hours Work	TUESDAY Date or Type	TUESDAY Cards Punch	WEDNESDAY Hours Work	WEDNESDAY Date or Type	WEDNESDAY Cards Punch	THURSDAY Hours Work	THURSDAY Date or Type	THURSDAY Cards Punch	FRIDAY Hours Work	FRIDAY Date or Type	FRIDAY Cards Punch
IDLE TIME	998-1	.5	998		.5	998		.5	998		.5	998		.5	998	
Payroll		.5	017-35	1100	2.0	020-36	2000									
		1.5	077-33	3100	2.0	603-31	1700									
		1.0	030-37	1100	.5	601-29	500									
								2.0	605-22	1500	1.0	C W				
S. Order								4.0	077-32	21000	1.5	603-32	2000			
								1.5	080-27	3000	2.5	605-22	4000			
Population Report		.5	031-2	800												
Checking Sheets		1.5	016-14	320												

EXHIBIT 1

Timetable on a Blackboard

We require that all source records, before being taken into the tabulating workload, be controlled as to contents by an adding machine tape which lists the items received and dollar value. It is necessary to produce the record in the tabulating department if the outside data is sent in without it. As to the scheduling itself, each month we display the major volume jobs on a blackboard and note due and actual dates for receipt of the work, key-punching or verifying, and machining (completion). Some of the jobs so scheduled are:

1. Incoming orders.
2. Billing.
3. Material withdrawals.
4. Weekly payroll earnings.
5. Labor distribution.
6. Perpetual inventory.

A Battery of Four Control Reports

Work performance within the department makes use of a number of reports. Each operator records on a Work Progress Chart, Exhibit 1, the time spent for various types of work in units of quarter of an hour, showing number of hours worked, type of machine and number, and volume of cards punched or used. From each work progress chart the following information is key punched on a tabulating card:

	NO. OF COLUMNS	CARD COLUMNS	REMARKS
Individual machine number	3	17-19	All machines are individually numbered.
Month and week	4	20-23	Two places indicate month. Two places indicate year.
Day and week	2	24-25	Two places indicate day of week.
Employee number and name	4	26-29	
Job number	4	30-33	
Division or department	2	34-35	
Type of machine	5	36-40	
Cards punched	6	41-46	Measured number of cards used.
Working hours	4	54-57	Actual hours worked.
Machine hours	8	65-72	Actual machine hours.
Cost	8	73-80	Cost for machines and employees.
Rate	5	58-62	

These cards afford the information for running subsequent reports, including a monthly machine report to determine machine use efficiency. This report takes the form illustrated in Exhibit 2 and shows name of machine, type of machine on job charged, total monthly rental charges, total hours available per month, actual number of hours machine operated and per cent of machine usage, that is, machine use efficiency.

There is also a monthly report on each department or division for which work is performed showing the amount it costs to do each job. Exhibit 2 comprises the detail of this record for certain jobs, showing job number, department or division charged, name of job, machine used, number of cards punched or used, hours worked, etc. From this report we can determine whether or not we are using the full capacity of the tabulating equipment.

The report on employees' machine time given in Exhibit 3 and also run from the cards which have been described, is used to determine the per cent of attendance time spent on the machines by each tabulating staff worker. Clerical functions in the tabulating department should be kept to an absolute minimum for, besides slowing machine processing, they use skilled machine personnel. This results in the loss of valuable machine time and the performance of paper work at a higher salary level than is usually necessary.

SCHEDULE OF Report 1

8 PART: W. E. I. CORP.

☒ MACHINE TIME ☐ EMPLOYEES MACHINE TIME ☐ OVERTIME

☐ DIVISION OR DEPT. CHARGED ☐ EMPLOYEES MISC. TIME ☐ MISCELLANEOUS

EMPL. NO.	DEPT.	DESCRIPTION OR NAME	MACH. TYPE	No. of Mach's.	Total Hrs. Machine	Total Hrs. Available	HOURS MACH.	$ Operation
		DUPL., KEY PUNCH	016	6	164.80	1,192.00	1,112.00	93
		ALPH., DUPL., PUNCH	031	2				
		AUTOMATIC VERIFIER	052	6	85.80	894.00	778.25	87

SCHEDULE OF Report 2

8 PART: W. E. I. CORP.

☐ MACHINE TIME ☐ EMPLOYEES MACHINE TIME ☐ OVERTIME

☒ DIVISION OR DEPT. CHARGED ☐ EMPLOYEES MISC. TIME ☐ MISCELLANEOUS

EMPL. NO.	DEPT.	DESCRIPTION OR NAME	MACH. TYPE	CARDS USED	HOURS WORKED	HOURS MACH.	C.P.M.	
101	1	JOURNAL VOUCHERS						
101	1		016	1,025	6.50	6.50	9.14	

SCHEDULE OF Report 3

8 PART: W. E. I. CORP.

☒ MACHINE TIME ☐ EMPLOYEES MACHINE TIME ☐ OVERTIME

☐ DIVISION OR DEPT. CHARGED ☐ EMPLOYEES MISC. TIME ☐ MISCELLANEOUS

EMPL. NO.	DEPT.	DESCRIPTION OR NAME	MACH. TYPE	Available HOURS	HOURS WORKED	$ Mach. Operation	C.P.M.	
KEY PUNCH	2128	95		112.50	111.00	99		
OPERATORS	2129			113.00	102.75	91		

EXHIBIT 2

The data punched from each individual's work progress chart which has been shown as Exhibit 1 is serviceable for special analyses in addition to machine use percentage, employee machine time percentage, and the cost of work for other departments data developed in the runs shown as Exhibit 2 to 4. Cards punched per day by the various operators is obtained and compared for operators punching the same number of columns. Machine hours and costs are resolved into cost per hour for the different tabulating jobs performed.

The possible variations of thus implementing observations of operations under schedule are quite numerous. They are particularly helpful to a supervisor who is not physically located in the tabulating department.

The Control Board

Additional techniques are used for more immediate scheduling. For example, a control board constructed with nails spaced evenly apart, on which are hung round tags in various colors to indicate progress and activity, is used for usual control of current operations where applicable. In one form this calls for the machine number at the top of the board and the months and days are shown down the left side. Here the tags display the schedule for the day shown. A white tag indicates that the machine is being used eight hours or a full day. A red tag indicates that the machine is not scheduled for use. A yellow tag indicates that the machine is out of service (repair or inspection). A green tag indicates that the machine is being used for a special job.

EXHIBIT 2

THE CONTRACT'S THE THING

NOW THAT WE ARE ONCE AGAIN in an economy geared to military supply, industrial accountants must be prepared to organize their procedures in such a fashion as to permit handling of government contracts expeditiously. Some may benefit from experiences of World War II accounting, while others are being exposed to this phase of operations for the first time.

For these the following recommendations, developed by the writer from experiences with cost-plus-a-fixed fee government contracts during the past year, may be helpful:

1. Be sure that you see and review each contract in detail **before** work begins, making a transcript of all financial and cost provisions.
2. Secure an official copy of the contracting agency's approved cost principles and study it carefully.
3. Submit invoices for payment only in conformity with the agency's approved method, together with complete supporting documentation.
4. Support all direct charges fully with **original** invoices showing internal check, date paid and check number, with original quotations, receiving reports and purchase order copies, each document indicating government contract number.
5. Review your accounting setup to make sure that both the prime cost and overhead-gathering procedures will enable quick and clean determination of contract costs at any time.
6. Review the contract with your purchasing agent, production manager and other operating people, specifying what information you will need from each.
7. Work closely from the very beginning with the government cost officer whose office will later audit the contract, as his information and advice will be invaluable in an educational way with respect to the procedures under which you will operate.

Strict adherence to the foregoing seven points will insure excellent relations with the contracting agents, a minimum of wasted time and effort, and fewer ulcers for the accountant in the days ahead.

CHARLES F. MARGESON, *Hartford*

POINTS

YEARS PASSED . . .

THE PENSION PLANS going into effect in various industrial plants throughout the country, will require a number of additional records. Uniformity of forms and records is impossible because of the many variations within the plans. Thus a problem is posed which each company must solve on its own.

In our plant a committee has been appointed to handle this and other aspects of administration of the plan. The committee consists of two representatives of the union, two members of management and one impartial member to act as chairman. (Briefly, our plan calls for pension, depending in amount on years of service, a full service year being any year in which a minimum of 1,800 hours has been worked.) In the discussion dealing with records, the question was raised as to what to do in cases of dispute regarding years of credited service, i.e., disputes which may arise 10, 20 or 25 years from now when original records may not be available. We settled on microfilming.

Our company does not at present accumulate hours worked, but we plan to do so at the end of the year by rubber stamping the earnings ledger with a form for this information and filling in the hours of credited service. These will be posted to the committee's service record cards. We will then microfilm the earnings record and turn

OF VIEW

the film over to the committee for their files. Thus, the committee can prove the accuracy of its own records and the company is relieved of keeping original records for extremely long periods of time.

WILLIAM F. DE HAAN, *Grand Rapids*

OFFICE HOUSEKEEPING PAYS

HAVE YOU SURVEYED the arrangement of your office furniture and equipment recently? A few minutes spent in quiet study of its arrangements and an analysis of the purpose each piece serves might suggest an improvement in the interest of convenience and time saving by simply shifting or rearranging, perhaps just a piece or two.

Some months ago I decided, after making such observations, that by moving the manager's desk about six inches and then moving a stenographer's desk about four inches, I could place a filing cabinet between these desks. One steel cabinet was moved into this position from the rear of the office where it had been for years, and was thus placed where either of these persons could extract and return information without moving from their respective desks.

The cabinet contains copies of orders, letters written, and letters received. Its contents are in demand daily. It had previously been some twenty feet distant from the stenographer's desk. Hence she had to walk forty feet to complete one reference. Now there is no arising from desk nor movement about the office, either to make reference to or to file information.

Try a similar survey and analysis. You may be surprised by finding what a convenience and time saver some little change would make in your office.

J. COHEN HIGGINS, *Chattahoochee Valley*

TABS ON SUBLET COSTS

TODAY, ACCUMULATIONS OF LABOR and material costs currently do not give a complete picture of operations in progress in companies in the general contracting industry, because virtually all contractors sublet part of their work. However, there is a simple method which can be used to record current data pertaining to subcontracts. The result is a means of controlling subcontractors' billings against their contracts and a readily available cost analysis.

An extra "cost" copy of every subcontract is made. This copy is used as the medium to record, in a separate ledger by project designation, the following information: name of subcontractor, total amount of contract, date of partial billing and/or total billing, amount and net balance. The sum total of all individual balances is the total of commitments against the main contract. This is added to the general contractor's own labor, material and equipment costs. Amendments for additions or deductions are handled in the same fashion.

The "cost" copy of the subcontract is filed alphabetically, for, as invoices are received, they are recorded in the "commitment book" before they are vouchered for accounts payable. Identification is somewhat difficult at times and the alphabetical filing eases locating the contract for checking the invoice. When billing is in full or completes the total of contract, the contract copy is attached to the invoice and becomes a part of the voucher.

KATHRYN E. REITZ, *Baltimore*

Economy Studies In Replacement Decisions

by T. W. LELAND

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Facts are the nucleus of judgment and, where they are to so serve, they must be presented in such a manner as to form a center to which considerations pro and con can be related. The studies for fixed asset replacements given shape in this article are in the direction of affording this guidance.

IT MAY BE SAID AT THE START that decisions relating to replacement of fixed assets should be planned as a part of the budget for capital outlay. This budget will include estimates for replacements, betterments and additions. Typical long-range plans encompass expenditures to be made over periods of three to five years, but some companies budget these expenditures for periods of twenty or more years. Short-term budgets of capital outlay usually extend over periods of six months to one year. These estimates generally will cover specific projects and also will allow for emergency capital expenditures.

The capital outlay budget should be an integral part of a master budget. Replacements, betterments and additions have an important effect on the estimates of future financial condition and the estimates of future earnings. The budgeted replacements will serve as control limits designed to attain a desired financial structure and the income objective. The responsibility for expanding the budgeted amounts should be clearly established with no overlapping controls. Generally, the budget provision sets an overall amount for capital outlay and leaves the acquisition of specific items to subsequent requisitions and approvals.

The replacement of fixed assets is a meeting place of many interests. The sales department is interested if the replacement involves a process which will change the qualities or quantities of the products which are sold. The controller and the treasurer are interested in the availability of funds for replacement and in the alternative uses of available funds. The engineer, factory superintendent and all of the division heads responsible to them are interested in the problems of technical operation. The technical aspects of replacement decisions should be left to foremen, section heads and superintendents, engineers and time-study men.

On the other hand the plant accounting men should have a part in the estimates of the cost of acquisition and of operation savings. Cost analysis should be primarily a responsibility of the cost department. It is the duty of the plant accounting section to estimate the cost of the replacement and prepare

summary estimates of savings. Here requests of the various departments for budget appropriations should be considered as to urgency and economic justification of proposed expenditures.

The Simpler Changes in Cost Patterns

There are many things to be kept in mind. One is change in cost relationships as well as totals. If a replacement involves the acquisition of a new machine of identical make and capacity as the machine being replaced, the chief concern is with changes in operating costs. On the favorable side, costs of repairs and supplies usually would be reduced. Possibly, also, there would be a reduction in labor costs because of the more efficient operation of a new machine as compared with the old one. It is likely, too, that there would be a faster output of product and fewer breakdowns. On the unfavorable side (because today's replacements are being made with dollars of reduced purchasing power), the replacement will generally involve a current expenditure substantially in excess of the original outlay for the old machine. If this is the case, there will be an increase in depreciation, insurance and taxes. The higher cost of replacement assets presents a very important problem in industries with large investments in plant and frequent need for replacements because of wear and obsolescence.

Here we are near the point at which the pattern of costs frequently changes in a still more fundamental way because of fixed asset replacements. Capital outlay for fixed assets at higher price or in response to technological advances tends to increase fixed costs and reduce variable costs. These changes, if significant, place new emphasis on maintenance of volume of production. They lessen management's opportunity to control costs, for higher fixed costs in relation to total costs cause unit costs to be lowered more rapidly as sales are increased, and vice-versa. The break-even point—the volume of sales required to cover fixed and variable costs—will be raised by an increase in fixed costs.

However, it will be lowered by a decrease in the variable cost ratio. When a proposed replacement will both increase fixed costs and lower variable costs, the break-even point may be raised or lowered, depending on the relative changes in the two classes of costs. Nevertheless, it is significant that break-even points have been rising in recent years. Despite economies, net cost change has tended to become a one-way street. The peak demand for civilian goods and materials for the needs of the armed services hides the dangers inherent in this upward trend of fixed costs. A substantial decline in demand or in selling prices would place many of the enterprises with high break-even points in a critical position.

Intrusion of Complexities

If the replacement is one which involves a machine of greater capacity, the change in capacity must be evaluated in terms of a balanced production within the plant. The increased capacity has little value if the machine will be idle while waiting for products to clear other machines and other processes. Apart from this, if the replacement involves an increase in production potential, the marketing problems of sales outlets, selling methods and selling prices at once present themselves. A substantial change in the quality of the product through a machine replacement may similarly result in a new demand schedule for the product and introduce these market considerations.

The matter of higher price levels is no small one when it comes to contemplating fixed asset replacements. Plant assets today cost two to four times the acquisition cost of the period from 1920 to 1940. In any type of replacement at these inflated prices, there are important considerations relating to the sources of funds for the replacement. The depreciation charges during the period of use of the assets being retired have not provided the funds now needed. Consequently, corporations with a large investment in plant assets must obtain replacement funds from retained earnings, new credits, or new capital contributions of stockholders.

The choice of sources for replacement funds poses problems. High rates of income taxes have made it difficult to provide the necessary funds from retained earnings. The cost of contributions by stockholders has been high. Under these conditions it has been logical to make borrowed capital the major source of funds for capital outlay. Short and long-term credit have been used. Although the problem of securing capital has not yet become critical, it is growing in importance with the current tendency of interest rates to increase. If the trend continues, it would seem good financial policy to seek equity capital for replacements rather than borrowed capital. The pressure for such change in financing would grow were there to be a decline in sales or profits in the near future.

Tax Considerations in Fixed Asset Replacement

The tax consequences of a replacement may be material to the decision to sell or scrap old assets and acquire new ones. The provisions of the Internal Revenue Code make a loss on sale of plant assets an ordinary loss and hence 100 per cent deductible. If the assets have been held for more than six months, a gain is treated as gain on the sale of capital assets and subject to a tax not exceeding 25 per cent of the recognized net gain. These tax provisions are

important in timing a replacement of fixed assets. Other things being equal, there is an advantage in concentrating replacements involving recognition of gain in one year and those involving recognition of loss in another year. If possible, it would be advantageous to take the gains in a year of a net loss, low ordinary net income or high tax rates. If the tax saving by establishing a loss on sale or exchange of capital asset can be determined with reasonable accuracy, the saving should be treated in an economy study, such as is recommended further on, as an offset to the cash expenditure for the new fixed assets.

If the new asset can qualify as a defense facility, a special sixty-month amortization period is provided for by Section 124A of the code. A defense facility can be land, a building, machinery or equipment. An entire plant or only a part of it may be certified as such. (Approval must be obtained from the National Defense Administration.) It is difficult to evaluate the tax saving involved in five-year amortization. The saving, if any, will depend upon income levels and tax rates during and after the amortization period. Because of the uncertainties relating to these factors, it is perhaps better in the ordinary instance to disregard the tax consequences of accelerated amortization of defense facilities. However, perhaps it should be noted for consideration when computing rate of return on investment represented by replacement savings, that tax savings from accelerated amortization will reduce average investment.

Forms of Economy Studies for Cost Reduction

To keep the subject matter in steadier focus, discussion in the remainder of this paper will be confined to replacements for the purpose of reducing costs and to the related problem of comparing the operating costs before and after the replacement. In this way the less easily determinable matter of changes in the markets for products will not apply. Nor will this article deal further with the question of sources of replacement funds.

The presentation will center around what may be called an economy study. Assuming the data in Exhibit 1, an analysis of the net saving in a replacement (over the remaining life of the old equipment) may be made in one of several ways as shown in Exhibit 2:

1. Using total costs.
2. Using alternative costs.
3. Using cash savings.
4. Using annual costs.

The comparison of total cost has the advantages of simplicity and fewer calculations and is, therefore preferable when there are three or more expense patterns to analyze. In a comparison of only two expense patterns, the alternative cost study emphasizes the cost differences. All operating costs common to

the two assets can be omitted in the comparison. Frequently allocations of indirect costs, such as those relating to building space, service department expense and indirect labor are not changed by reason of a replacement. These costs are difficult to assign to the old and new asset and their elimination in an economy study materially lessens the work in making a comparison of operating costs. However, when common costs are omitted, the sum of the cost items compared naturally has significance only for purposes of comparison.

Data for Economy Study of Asset Replacement

	Old Equipment	New Equipment
Estimated current value	$ 2,000	$
Cost	10,000	20,000
Reserve for depreciation	6,000	
Annual depreciation		
on cost - 10 years	1,000	2,000
on present value - 10 years	200	
Operating costs - annual	9,000	6,000
Income from sales of products - annual	12,000	12,000

EXHIBIT 1

The cash savings method compares the aggregate of out-of-pocket operating costs of the old equipment plus its present cash value with the aggregate of out-of-pocket operating costs of the new equipment plus the cash outlay for acquisition. The inclusion of the cost of equipment is in effect an inclusion of depreciation (which figures as an operating expense in the total and alternative cost comparisons), since depreciation is a charge to absorb cost of equpiment. Dr. Sterling K. Atkinson in an article in the September, 1950 issue of the *Bulletin* on "Replacing Long-Life Assets for Cost Reduction," expressed a preference for the cash savings method. Dr. Atkinson said:

> "Since the only purpose of a cost reduction investment is to spend less money, it is submitted that the analysis should be made solely in terms of cash. This has the advantages of simplifying the analysis and of measuring the cost reduction only in terms of cash savings."

An analysis of comparative results using income is not included in the illustrations given here because one of the conditions assumed is that there will be

Economy Study

1. Total Costs

	Old equipment		New equipment
Operating costs (exclusive of depreciation)	$90,000		$60,000
Depreciation	2,000	(1)	20,000
Total costs	$92,000		$80,000
Net saving using new equipment			$12,000

(1) Depreciation of current value of old machine.

2. Alternative Costs

	New Equipment Saving (or Loss)
Operating costs (exclusive of depreciation)	$30,000
Depreciation	(18,000)
Net saving using new equipment	$12,000

3. Cash Savings

		Old equipment	New equipment
Operating costs (exclusive of depreciation)		$90,000	$60,000
Cost of new equipment	$20,000		
Less value of old equipment	2,000		18,000
		$90,000	$78,000
Net cash saving			$12,000

4. Annual Costs

	Old equipment	New equipment
Annual operating costs	$9,000	$6,000
Annual depreciation	200	2,000
	$9,200	$8,000
Annual saving using new equipment		$1,200

EXHIBIT 2

no change in performance of the two machines. Income can rarely be allocated to the fixed assets involved in an economy study. If the income is the same for old and new equipment, the amount will not affect the determination of the net savings in the replacement. If the new machine has a greater productive capacity, which will not be used, the cost comparison would be made at practical capacity. Any potential advantage because of possible future use would be a consideration but one which could not be reflected in dollar cost comparisons.

If, however, the greater capacity of the machine is required and reflected in additional gross income, the analysis of savings must either reflect the difference in net income or it must be placed on a per unit basis. A net income comparison appears in Dr. Atkinson's article. Engineering studies of such problems have more commonly used a cost per unit analysis.

The analyses in Exhibit 2 assume that the old equipment can be repaired and kept in operation for the estimated useful life of the new equipment, i.e., ten years. The repair costs in each instance are not shown separately but are intended to be reflected in operating cost totals. Of course, continued use of an existing machine might be impractical if it resulted in break-downs and increased the idle time of other machines, thus creating a condition in which production was out of balance. Such an asset should be replaced, apart from the showing of an economy study. There are other stiuations, also, in which economy studies will not provide a basis for a decision as to replacement. Prospective price increases at a future date when replacement could not be postponed would be an example. The prospect that the replacement asset would be unavailable in the future would be another.

If the old equipment has a shorter remaining useful life than the new equipment, i.e. five years, this period should be used for the cost comparison. For the purpose of economy studies using total and alternative costs, depreciation of the new equipment would be computed as cost, less the estimated value at the end of five years. The same subtraction will give net outlay for the new equipment for the cash basis comparison. This is simply to say that the economy study should be made for the period which best reflects the alternative decisions facing management. If use of the old equipment for ten more years will make it necessary to incur an immediate overhauling expense, such expense should be treated as an additional cash outlay. The present salvage value of the old equipment plus the additional outlay would be reflected in the depreciation cost in the total or alternative cost summarization.

Some Rules Governing Economy Studies

To recapitulate and also to elaborate at several points, the following features of economy studies may be set forth as of prime importance:

1. The current value of the old equipment is used, not the book value. The latter is likely to be higher by the difference between actual and book depreciation in past years. It is a sunk cost which has lost significance in an economy study except as it is a factor in a tax saving. The accounting loss arising from the write-off of existing book value of the old asset, after credit for sales proceeds or scrap, is a factor for consideration along with the economy study. It is not a part of the economy study.
2. The installed cost of the new equipment should be used.

3. Disposal value of the new equipment should be ignored if it is negligible or impossible to estimate with reasonable accuracy. If disposal of the old asset involves net additional outlay, such outlay should be considered as a part of the cost of the new investment.
4. When the alternative cost method is used, all costs common to both alternatives should be eliminated.
5. Any period of time may be used in an economy study. Generally it is helpful to use the shorter future life represented in a comparison. In selecting the asset of shorter future life, comparison should be made using either the economic or physical life, whichever is less, for each asset in the comparison. Frequently, a period of one year is used. However, this method requires careful determination of annual costs.
6. Depreciation is generally calculated on a straight-line basis. Its use as a comparative cost ordinarily injects into the net saving computation a conservative bias against replacement.
7. The comparison should be made in terms of future costs, not past costs.

In the illustrative economy study which has been given in its several forms, the operating costs are not detailed, except for depreciation. The omission of detail was for the purpose of saving space and emphasizing the essential features of the comparison. In practice it is necessary to determine or estimate individual cost items such as:

Direct labor	Power
Indirect labor	Supplies
Social security taxes	Insurance
Workmen's compensation	Taxes
Maintenance	

If fixed charges, such as insurance and taxes, are estimated as a percentage of asset value, the percentage should be applied to average investment. Average investment may be calculated by multiplying one half of the sum of the original investment, net of the estimated salvage value, by the fraction $\frac{N+1}{N}$, N being the years of estimated life. Using the data in Exhibit 1 the average investment of the new equipment is $1\frac{1}{10} \times \frac{1}{2} (20{,}000 - 0) = \$11{,}000$. Frequently a less accurate determination is made by taking one half of the sum of the original investment net of the salvage value. Using the same data, the average investment would then be $10,000.

Interpreting the Results of an Economy Study

The decision to make a replacement is justified when the savings (or increased net income) represent a satisfactory return on investment. Ordinarily the rate of return is determined by using annual net saving and average investment. Frequently, however, the rate is determined as a percentage of original investment. The first method assumes that a depreciation charge during the period of asset use holds funds in the business and that such funds are earning the equivalent of the interest rate. Accordingly each period would have an investment

equal to the original cost less the reserve for depreciation. This amount decreases each year. If this assumption is correct, average investment seems to be the proper base for the interest charge. This second method holds to the view that interest should be earned on the original investment throughout the life of the asset. The latter is, of course, a more conservative method with a bias against replacement.

Using the data in Exhibit 1, the rate of return on the two methods would be as follows:

Return on original investment in the new equipment:

$$\frac{\$1,200}{\$20,000 - \$2,000} = 6.67\%$$

Return on average investment in the new equipment:

Average investment regarded as one-half cost

2 x 6.67% (see above) = 13.33%

Average investment computed more exactly

$$10/11 \times 2 \times \frac{\$1,200}{\$20,000 - \$2,000} = 12.12\%$$

Practice also differs as to the proper standard against which the actual rate of return should be compared. Generally, the rate of return on the cash outlay for the new asset should be compared with the return required by the business. This may be the return available on alternative investment of equal risk or an arbitrary standard of more than this amount. Occasionally writers recommend a rate equivalent to the cost of borrowed capital but this practice seems to ignore the risk factor. Depending upon the degree of risk, rates as high as 12 per cent or 15 per cent are sometimes used. Obviously the rate in the illustrative problem is not adequate.

Quite often economy studies include interest on investment as an operating cost. Occasionally they include interest on operating costs in addition. If such interest is included in economy studies, the rate of return obtained by dividing the net savings by investment outlay (or investment outlay and operating costs) will represent interest in excess of requirements of the management.

In practice the decision to acquire new assets is frequently justified by the pay-off period. The pay-off period on a given replacement is determined by dividing the net capital outlay by the difference in annual operating costs, exclusive of depreciation and interest on investment. Using the data in Exhibit 1, the pay-off period would be determined as follows:

$$\$18,000 \div (\$3,000) = 6 \text{ years}$$

The pay-off period should not be less than the expected use-life of the new asset. Assets subject to early obsolescence should have a short pay-off period.

If the replacement asset is subject to early obsolescence, the pay-off period should be substantially less than that of an asset with assured long life. Likewise the pay-off period should be short when the risk is great and when there is doubt as to the life of the asset because of uncertain markets or probable change in production methods.

If net savings are obtained using high depreciation which covers abnormal obsolescence, a replacement may be justifiable if any net savings are indicated in the economy study.

Judgment Dictates the Final Decision

The final decision of management with respect to outlay for new assets involves many considerations which are not subject to precise measurement and likewise involves considerations which cannot be reflected in economy studies. The economy study presented in this discussion serves only as a general guide in making the decisions. The accuracy of the data used will have an important bearing on the reliance which can be placed on the results of such a study. As has been emphasized, many of the factors used in the study are necessarily estimates.

Nevertheless, the presence of estimates in the information assembled for the purposes of the study and the fact that those who use such a study must go beyond it in the exercise of judgment, are merely limitations of a serviceable tool. Use of it will assist markedly in raising the level of accuracy in fixed asset replacement decisions.

Ten Qualifications of A Plant Controller

by DONALD F. LINCOLN

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The present article comprises a brief review of principal qualifications which a plant controller, or accounting official with like responsibilities, must have in a marked degree. As the author develops each of the ten enumerated, it becomes apparent that the individual envisioned must possess, in sum, competence, independence, and a will to serve.

IN OUR COMPLEX ECONOMY of today, with many manufacturing firms operating a large number of branch plants, the position of plant controller is becoming increasingly more important. With this in mind, there is set forth in this paper those qualifications of a plant controller which are believed to be most nearly essential. The qualities selected for presentation—and for discussion and analysis—could have been either fewer or greater in number. Such selection is necessarily arbitrary, but it is felt that those dealt with here cover the field in at least a serviceable way.

The Rating Elements and Their Graduations

In rating the plant controller, the basic assumption is made that the position is one of very real importance and can be filled properly only by a man of considerably more than average ability and qualifications. Suggested rating factors and gradations are presented in Exhibit 1, with hypothetical markings.

RATINGS FOR A PLANT CONTROLLER

	Minor ability	Mediocre ability	Sound ability	Exceptional ability
1. Character				x
2. Breadth			x	
3. Judgment			x	
4. Technique			x	
5. Accuracy			x	
6. Initiative				x
7. Quickness				x
8. Supervision			x	
9. Interest				x
10. Congeniality			x	

EXHIBIT 1

It is recognized that the terms in which the position requirements are expressed and the degrees or gradations set forth for the rating of qualifications, are essentially subjective and share the usual limitations of any such qualitative analysis. However, the four degrees illustrated do represent readily grasped relative values for each of the qualifications. It may be assumed that a suitable candidate for plant controller should possess these qualities in high or even exceptional degree. Hence the columns in which the x's fall in Exhibit 1. It does not follow, however, that a lower rating in one or more qualifications might not be offset in particular cases.

Character, Breadth, Judgment

It is perhaps of most importance to follow through the substance of the qualities a plant controller must have. The high character required of the plant controller, as of any other executive, comprehends a complete honesty of manner and purpose in all aspects of his work and in all his relations with his associates. The very best the word "character" means is not too much to be expected of any man in this position.

It is similar with the second element for rating. Breadth implies the ability to look beyond the merely technical accounting aspect of the position and to have a firm grasp and a clear understanding of the purposes to be achieved. This quality of outlook should extend to the whole operation of the division in question, so that the plant controller may use the accounting information which is developed by his organization for the fullest help and benefit of his plant manager. Breadth implies a large measure of the common sense of a reasonably successful business man in addition to special knowledge of accounting. It implies a knowledge of and interest in the division's products, the economy in which it operates, the community where it lives, and the persons with whom all undertakings must necessarily be carried on.

Judgment might be considered as an extension of the second rating element, i.e. the application of a broad point of view to specific problems of operation as they arise. Good judgment enables a man to separate the important from the unimportant, to understand how to put first things first, and hence to expend his time and effort where it is the most necessary. Directed to people, judgment has a particularly important application in the building of an organization around the plant controller. Within the broad limits of policy laid down by the company controller, the plant controller ordinarily has wide scope for the exercise of his own judgment and discrimination in assembling such an organization.

In his relations with the company controller, good judgment will dictate the

plant controller's adoption of more than a mere passive compliance with policies and procedures issued by the former. There will be an active flow of information to the company controller, even where no specific question or requirement for approval is involved.

Accounting Techniques

The techniques of accounting available to the plant controller and required to be used by him in the adequate discharge of his responsibilities are in no way different from those in use by the company controller. They represent certain technical tools which are invaluable if mastered but are completely useless if only partially understood or if treated as mysteries in themselves.

Account planning, for example, is simply the orderly accumulation of information in a predetermined manner for a predetermined purpose. Comprehensive account planning methods are prescribed by the company controller. A well-designed scheme of accounting reduces much of the work to routine, inasmuch as the appointed destination of every figure has been thought out ahead of time. Such a system also brings to the fore unusual happenings, thus reducing the amount of attention which must be given to detail figures at each stage of processing.

Budgets constitute another technique through which the plant controller makes his organization serviceable to management to the fullest extent. While it is true that the subject matter of budgets belongs to the responsibility being budgeted, it is also true that the plant controller, as a specialist in the technique of budgeting, can render invaluable assistance to operating executives at all levels in both preparation and management use of these budgets. The value of budgets in a company-wide consolidation is strictly limited by the worth of the individual budgets going into this consolidation. Unless they are soundly constructed and understood by those for whose guidance they are provided, they do not represent realistic estimates of what is likely to happen, nor do they assist division management in the planning of operations and the rectification of mistakes. When drawn together in consolidation, they do not aid top management in informed planning for the future. It is the plant controller's business to see that budgets do accomplish these things.

In the matter of procedures, these are at the disposal of the plant controller to a number and variety limited only by his knowledge and versatility. They vary from the simplest of forms to the most complicated and comprehensive system issued by the company controller, but they all have a common objective—an orderly, low-cost efficient method of doing necessary things. The principle

is invariable. Basic policies of accounting control expressed in the company controller's general policies and procedures will govern here but will be found to implement rather than stay the plant controller's hand.

Standard or planned costs have control functions similar to those of budgets and represent a most valuable tool in the hands of the man who knows how to use them. Here too, the principle is simplicity itself. The concept is predetermination of what it is desired to do and measurement after the event to see how performance came up to expectation.

Whatever the technique, the mechanics of using it must be mastered in order to realize full benefits, but no amount of mastery of method can compensate for failure to grasp the underlying principle. The objective of all accounting techniques and systems is to assist in increasing profits. They have no other justification. They must always be thought of as means to that end.

Accuracy, Initiative, Receptivity

Accuracy is one of the homely virtues which is expected of the most limited accountant but, as here used, it is intended to cover such complete accuracy of all statements and information given to both superiors and subordinates as to settle in advance the question of complete dependability.

Initiative is most frequently expressed in a willingness, not to say eagerness, to shoulder responsibility. The plant controller who is really doing his job cannot wait to be told very many things. He must do them on his own, right or wrong, and be willing to accept the risk and responsibility of being wrong as well as right. Initiative should be tempered more with sound judgment and breadth of view than with blind, timid caution.

The ability to grasp new ideas quickly is an important qualification of the successful plant controller. In any live organization new ideas are constantly arising and the man who can appraise new ideas, separate the valuable from the unimportant (whether with respect to the whole or to parts of each idea), and can look upon new proposals objectively and dispassionately, has a potent advantage. This definitely does not mean acceptance of the new for its novelty nor does it mean clinging to the old for the sake of its familiarity.

Supervision

Supervisory ability is not peculiar to plant controllers. On the contrary, it is a necessary ingredient of all capable executives, from the lowest to the highest. This ability is not limited to merely seeing that the subordinate organization keeps physically busy. It is concerned with seeing that the organization is use-

fully busy and reasonably happy in the satisfaction of doing good work. It is not a matter of driving but rather of leading. Effective supervision is impossible unless those being supervised have a genuine respect for their superior. Such respect cannot rest on authority alone but must be based firmly on the innate qualities of the supervisor. A good supervisor does not get that way by instinct nearly so often as by patient and diligent study of his job.

One of the most important aspects of supervising, which requires particular thought on the part of one who enters executive duties for the first time, is divesting himself of routine detail work. If the organization is important enough to warrant a well-paid head as plant controller, the job is important enough to require full-time attention over-all. There is not enough time for energy to be frittered away on routine matters which should be handled by other persons in the organization. It is frequently true that the plant controller will be well aware that he could perform a given detail job better than the person to whom he must assign it. Persumably that is one of the reasons why he is controller but, if the executive point of view is to be developed and maintained, it is essential that temptation to aid, correct, and do the work, be resisted with great firmness.

Interest; Congeniality

The interest of an intelligent man can be held only with ever-increasing accomplishment. It is not sufficient to do a good job and "coast." The first and most stimulating reward of accomplishing any difficult job must be the knowledge that such accomplishment paves the way for yet further accomplishment. There are a number of ways in which keen interest in the work can be aroused and developed. The plant controller will know of many and they will include an active interest in matters of accounting, together with thorough conversance with all aspects of the business. He will be keenly aware that nobody has a monopoly on useful and profitable ideas. He will realize that a large and satisfactory part of his compensation consists of a genuine and abiding interest in his work. Anything less would make the work a mere job.

The ability to get along with people is as essential in the position of plant controller as in other walks of life. The man who possesses an abundant degree of the other qualities discussed above will have no difficulty working with people. He will realize that the basis for true congeniality is a mutual respect, that he must give as well as take, and the he cannot always have his own way.

On the other hand, the very valuable ability to compromise must not be confused with an abject servility. The plant controller should have his own opinions, based on facts and thought. He should be willing to stand up for his

opinions, and fight for them if necessary. Nevertheless, he should also recognize that every situation has a practicable solution. Stubbornness which leads to tilting at windmills should have no place in his work. He will recognize that, above all, a man's associates respect honesty, sincerity, friendliness, and competence. Respect is a firm basis for cordial relations.

Qualifications of Two Sorts

Thus it is that the qualifications necessary for a capable plant controller are of two kinds, general and technical. The general qualifications are the same as those of any capable and successful executive in any field of business. The technical qualifications represent tools which, as a highly skilled specialist, the plant controller can use to increase his effectiveness.

Task of the Time and Production Reporting Staff

by FRANK O. CALL

Methods Staff, Caterpillar Tractor Co., Peoria, Ill.

The recording of the application and results of employee time and effort, whether for immediate purposes of control or the further objectives of costing, is a difficult undertaking in a small plant and an all but baffling task in a large one. This article describes procedures through which one company of substantial size effectively achieves both the short and long range goals through the operations of its timekeeping and employee performance staff.

THE FACTORY ACCOUNTING DIVISION of Caterpillar Tractor Company is organized in two sections which will be discussed separately in this article. One, the timekeeping section, is engaged primarily in accounting for time and the accumulation of cost data. The other, the performance section, is concerned with the computation of labor performance ratios. However, before dealing with either in particular, a few facts and figures may provide an appreciation of the volume of work processed.

Personnel of the factory accounting division keep attendance records for approximately 20,000 workers on the hourly payroll and 2,500 on the weekly payroll. In addition, approximately 22,000 labor job cards and many "line operation" reports are processed for hourly employees each day, while recorded production reporting involves the preparation of some 32,000 tabulating cards for each accounting period. This work is performed by more than two hundred employees, most of whom are located throughout the plant at factory accounting stations. Of course, the completion of payrolls, performance reports, and tabulations for labor distribution and production require the employment of many others, especially in the payroll and tabulating divisions. Mechanical equipment is availed of, wherever possible, to accumulate masses of detail and the use of this equipment is largely responsible for successful operation of the factory accounting system.

The wealth of information provided by the system more than outweighs any objections which may be raised on the grounds of its complexity. At Caterpillar Tractor Co., standards of performance have been established for direct labor functions. These standards are used to determine performance percentage ratios for individuals, sections, manufacturing departments, and plant divisions. It is the responsibility of the factory accounting division to accurately report on both the attendance and performance percentage ratios for employees and to

distribute labor charges to proper accounts. The time of semimonthly and monthly paid employees is not recorded by attendance time clocks and the factory accounting division does not account for it.

TIMEKEEPING SECTION

The timekeeping section is divided into four subsections on an area basis, each with a central office through which the activities of the factory accounting stations in the subsection are coordinated. Personnel in these central subsection offices are responsible for the coordination and distribution of attendance cards, preparation of job cards, and transfers of employees' cards between sections or departments. Notices of new hires, separations, occupational injuries and leaves of absence are processed as a part of the coordinating routine. Locator cards are kept on file for hourly and weekly employees in each subsection to provide immediate reference in the processing of any change in employee status. Supervisors in the subsection offices control the operations performed by the clerks in their respective areas.

Attendance Cards

Attendance cards in tabulating card form and produced from master rate cards in the payroll division of the accounting department are delivered to subsection offices, each prepunched with the employee's name, identification number, clock rack (stand) number, department number, and pay rate. The pay rate is coded in the card to prevent interpretation by those who will handle the card in the factory. The cards are delivered to the subsection officers in clock stand number order before the start of each week and are distributed by subsection personnel to the proper clock stand after the changes made necessary by transfers and separations have been effected.

Employees on the hourly and weekly payrolls are required to record time at work by punching attendance cards when they enter the plant at the beginning of their shift and when they leave at the completion of their work. Attendance cards are reviewed daily by the factory accounting clerk to determine that they have been properly punched in and out. Any deviation from the standard shift of an employee must be explained by a special coded posting on the attendance card and the irregularity must be initialed by the employee's immediate supervisor. From the attendance cards, the time worked each day is posted by the factory accounting clerk to a daily time record kept for each employee as a reference to the employee's attendance history.

In addition to recording the attendance of employees, attendance cards are

used to distribute labor charges for hourly employees in those departments in which the labor is recurrently chargeable to a limited number of labor classification accounts. Such departments are referred to as "exception" departments as distinguished from "regular" department, in which labor job cards are used to record labor distribution.

Upon completion of the work week, attendance cards are sent from the factory accounting division to the payroll division where the "exception" departments are tabulated by account number within department to establish labor distribution totals. The cards, together with the attendance cards from the "regular" departments, are then used in the preparation of the payroll for the period. (Labor on the weekly payroll is charged into separate accounts established for control of weekly labor and thus presents no problem in labor distribution. Attendance cards only are required for those employees on the weekly payroll and these cards are processed separately from those punched by hourly employees.)

Labor Job Cards

The recording of labor time distribution, with the exception of those cases in which only attendance cards are required, is accomplished through the use of labor job cards prepared, as are the attendance cards, in punched card form to permit the accumulation of labor charges by mechanical equipment. Both direct and indirect hourly labor time is recorded by classification account number on the labor job cards. Since the cards already indicate the factory division in which the employee is working and since the departmental control account governing the division is easily ascertained, the factory accounting clerk is required to post only the proper labor classification account (the figure "14" in the example given in the next paragraph) to enable the payroll division to distribute the charges mechanically.

Labor (like other controllable expenses) at Caterpillar Tractor Co. is chargeable to the department exercising direction of the expense. Control numbers have been assigned to each department and division and expenses are charged to one of the eighteen departments within the company and to a division within that department. Further, labor classification accounts have been established for the various types of direct and indirect labor performed in the plant. Thus, labor charged to Account No. 860-67-14 would indicate that the charge is for trucking (Labor Classification Account No. 14) performed in the machine shop in building "V" (Division Control Account No. 67) and that this unit is a part of the manufacturing department (Departmental Control Account No. 860).

Labor job cards are delivered to the work area with the employee's name,

identification number, and department number prepunched and interpreted on the card. Job card time recorders are located throughout the plant at factory accounting stations. Each employee is required to punch a job card in and out to afford the information for computing elapsed time on a specific operation or function, except that on the last assignment for his shift, an employee is not required to punch out. Incidentally, the use of continental time (for attendance and job cards alike) registered in tenths of hours, avoids much confusion.

Development of Performance Data

All cards bearing indirect labor charges are posted individually with elapsed time by the factory accounting clerk. However, cards bearing direct labor charges for operations on what we call "base time" need not be individually posted. Instead, the total time spent by each employee on such direct labor operations is posted to the last card. In addition to posting labor time charges to the job cards, the factory accounting clerk is required, in the case of direct labor charges, to indicate the number of the piece part on which the labor is expended, the operation, the machine tool or tools over which the work is routed, and the unit performance hours allotted that particular operation.

It is the unit performance hours which are referred to as "base time." They are determined by reference to the applicable operation on production work orders prepared by the planning division of the manufacturing department for each piece part in regular production. Base time has also been established for wheel changes and setups on the various operations and this allowed time, when such functions are performed, must also be posted to the job cards. In addition to these postings, when an employee changes operations or quits work on a particular part, the factory accounting clerk posts to the labor job card the number of pieces completed.

Posting of the above information furnishes the details necessary for personnel in the performance section of the factory accounting division to compute the performance ratio of the individual employee and his section on direct labor functions. The term, "performance ratio," is used to describe the relationship between actual hours spent on direct labor operations and the standard or base time established for those operations. This term is preferred to "labor efficiency," since many other than the efficiency of the worker may enter into the establishment of his performance ratio.

Postings to Work Orders

Information contained on the job card is posted to the back of the applicable work order. The date, employee identification number, number of the machine

tool on which the operation was run, and the pieces completed are posted by operation number. Produced pieces are added cumulatively on the work orders which are released by schedule. Thus, pieces through the first operation may be completed through one schedule and may be running on the second at the same time that subsequent operations are still in progress on the first schedule.

The posting to the work order permits both the factory accounting clerk and the foreman to readily ascertain the status of any particular piece part and the state of completion of any schedule covering production of that part. Factory accounting clerks are responsible for keeping the production work orders in their areas in good order by closing out completed orders and filing current ones in loose-leaf books which are kept at factory accounting stations for that purpose.

Posting of Scrap and Re-work

Under the present accounting system, the factory accounting clerk posts to the job card all pieces reported by the worker as being completed through a particular operation, regardless of the fact that some of these pieces may be rejected later by the line inspector because of faulty material or workmanship. This gross production is further posted to the applicable operation on the work order in the manner previously described. Obviously, if all rejected pieces were reworked and again posted to the work order, a double posting would result for the operation on which they were rejected.

However, if a part or all of the rejected pieces are scrapped, and therefore not re-worked, fewer pieces will be in production. Consequently, all operations following the one on which the material is rejected will be short the number of scrapped pieces. To close the production work orders and maintain a closer control on materials, pieces scrapped are posted to all operations subsequent to the one on which they are scrapped and are added into the cumulative totals on these operations. Such postings are made in red pencil to differentiate between regular postings of production from labor job cards and postings of scrapped material. Scrapped pieces are deducted from the cumulative totals shown on work orders when production is reported for the period for record purposes as will be described.

It should be noted that under this system pieces are not reported as scrapped on the first or last operations (the operations for which production report cards are prepared). Pieces scrapped on the last operation are reported on scrap reports from final inspection stations and are later deducted from the production of pieces turned in as good on production report cards.

Since rejected pieces are not necessarily re-worked in the area in which the

controlling work order is kept and since the personnel of the factory material control division are concerned, as the title implies, with the control of material movements through the plant, its staff is made responsible for posting scrap to the production work order. The factory accounting clerk posts only to the re-machining tag used as a control for materials re-worked in his area. After pieces are re-worked, they enter the regular flow of production material and are posted to subsequent operations in the regular manner from labor job cards. No base time is established for re-machined pieces since this work is considered to be indirect labor.

Job Cards Tied into Payroll

Indirect labor charges and charges for special labor performed on the hourly payroll are reported by the use of the labor job cards. In addition, absentee time to account for the full work week of the hourly employee is reported in a like manner. Labor job cards are "balanced" with the attendance cards in the payroll division to determine that all charges have been accumulated.

It may be seen, therefore, that the labor job card accomplishes at least four important functions. It is used to distribute labor time charges, it reports the details necessary for the computation of performance ratios, it provides spot reports of production to assist schedules, and it acts as a check on the accuracy of the time recorded on the attendance card. However, it should be noted at this point that the produced pieces reported on the job card are used only for posting production to the work order and for computation of performance ratios by the performance section but not for reporting production recorded on the books of account. This function is accomplished by the use of production report cards depending only selectively on information appearing on the work orders and derived from the job cards. The preparation of these report cards will be described later.

Line Function and Paint Reports

The work of the factory accounting clerk is somewhat simplified in those areas in which a number of employees are engaged in group operations, such as the assembling, testing, or painting of prime products. Production in these areas is on base time but is reported by the use of a line function report or paint report, which eliminates the necessity of a reference or a posting to a work order. Such functions are known as "line operations" and are not usually covered by production work orders. They are therefore not reported production-wise on labor job cards but job cards are prepared up to the point necessary to show the time of the employees engaged in such operations.

The independent line function or paint reports of production are simple daily tabulations of units produced or processed, listed by piece part number. Base time is applied by personnel in the performance section in the computation of performance ratios for employee groups whose production is listed on such reports. This will be mentioned again later. It should be noted that the production shown on "line operation" reports is not used to record production on the books of account but simply to provide data for the computation of performance ratios and to assist in immediate scheduling.

Reporting Production

At the end of each accounting period, the factory accounting clerk prepares production report cards for the total number of good pieces shown as produced to date on the first and last operations on each production work order. The term "good" as used above is misleading if not qualified. It should be remembered that pieces reported on the first operation may include production scrapped on that operation but posted as scrap only on subsequent operations. Also, pieces reported on the last operation may include items scrapped on that operation and deducted from production by scrap reports from final inspection.

The figure turned in for good pieces by the factory accounting clerk will be the number of pieces run through the first operation, whether any of the material was scrapped or not and the cumulative total on the last operation minus pieces scrapped on operations other than the "last." Therefore, the production turned in on production report cards does not necessarily represent good pieces in the strictest sense of the word but represents instead a figure from which certain additional items of scrap may be deducted to determine the actual good production.

The terms, "first," and "last," also require a word of explanation. Operations designated on the work order as first or last are those on which it is practicable for the machine operator to keep an accurate count of production and for which standard base time has been established. These operations do not necessarily appear first or last on the work order but may be preceded or followed by operations covering indirect labor functions or "line operations."

In form the production report cards, like the attendance cards and labor job cards, are tabulating cards. There are two for each work order on which pieces have been worked during the period, one for the first operation, another for the last. These cards are prepared in conjunction with the work order to which they apply and are delivered to the desk of the factory accounting clerk prepunched with the number of pieces reported as produced in prior periods. The

factory accounting clerk is required only to post from the work order the total of pieces produced to date on the cards covering operations on which there has been activity during the period.

Subtraction of previously reported pieces is performed mechanically by the tabulating division of the accounting department to which the cards are forwarded for processing. A master standard cost deck is maintained in the tabulating division and production report cards are merged with this deck for mechanical costing. They are then used to prepare tabulations showing the pieces produced and the standard cost of worked material production for the period. New cards are punched showing the cumulative total of pieces reported to date. These cards are delivered to the factory accounting clerk and the cycle is repeated for the following period. Under the cost system in use at Caterpillar, only reports on "first" and "last" operations are necessary to account for the production of worked materials.

Reporting the recorded production of "line operations" is a tabulating function performed by personnel of the production division of the manufacturing department and does not concern the factory accounting clerk.

Personnel of the timekeeping section of the factory accounting division must be endowed with the ability to accomplish good work under distracting and adverse conditions. They are in a position to materially affect the accounting for labor distribution, labor performance ratios, production, and transfers between inventories. It is vital that this accounting be accurate, in spite of conditions in the various shop areas not conducive to accuracy.

PERFORMANCE SECTION

The performance section of the factory accounting division is responsible for processing labor job cards, line function reports, and paint reports to establish the performance percentage of each individual, section, manufacturing department, and factory division concerned with direct labor charges.

Computing Performance Ratios

Since performance reports are issued for each day the factory is in operation, the working of performance percentages involves the computation of earned base hours on thousands of job cards daily. Labor job cards are processed by section for this purpose. Several job cards may be received for a single operator but personnel in the performance section compute and post the total earned base hours and performance percentage (arrived at by dividing base hours by actual hours) attained by each employee to only one job card, the one to

which total elapsed time chargeable to direct labor has been posted by the factory accounting clerk in accordance with procedure presented earlier in this article.

Earned base hours are computed by multiplying the quantity of pieces completed on each operation by the standard base time established for the function and adding any allowances for machine tool setups, wheel changes, or lunch periods indicated on the job card. Problems may be encountered where one or more machines are operated by an unequal number of employees or where the production of a group appears on one job card. Usually such situations require nothing more than that the job cards be cross-referenced to identify group members and that the total earned base hours be divided equally among the group. In computing earned base hours, an allowance for the lunch period is added if such time falls within a period during which the workman is engaged in a direct labor function. Since workmen are paid for the lunch period, which is included in the regular eight hour shift, this time is charged to the direct or indirect labor category for the job card on which the expired lunch period is recorded.

Computed cards, still in batches by section, are forwarded to the tabulating division where they are key-punched and used to prepare performance reports by shop sections. The cards not used for computation are filed in the performance section.

"Line Operation" Reports

Line function reports and paint reports, which are received from the time-keeping section with labor job cards, show by piece part number the quantities of production units assembled, tested, or painted by a particular group of employees. As stated previously, production for these "line operations" is not usually covered by production work orders and is, therefore, not reported on labor job cards (although such cards exist for the employees' over-all time spent in these operations). Base time applicable to one unit of production of this type is determined by reference to a table maintained in the performance section showing the standard base time established for "line operation" production.

This time is posted to the line function or test report and is then extended by multiplication of the quantity listed on the report as completed. Addition of the extensions, of base time results in total earned base hours for the line function, test, or paint report. Division of the total earned base hours by the actual time reported on job cards for employees covered by the particular report results

in the performance percentage for the group. Obviously, the performance percentage of the individual worker is not determinable in these instances.

Performance Reports

Performance reports are issued for each day of factory operation. This requires adherence to a strict schedule in the processing of labor job cards and "line operation" reports. Daily performance reports list each man separately and show the hours worked, earned base hours, lost time, direct labor percentage, and percentage of indirect labor to direct labor at base. Indirect labor hours are broken down into two groups: (1) charges to repairs and special orders and (2) charges to other indirect labor. This breakdown is of special value to management. The performance percentage of each section as a whole is also shown on the daily reports which are prepared for each of the operating shifts.

No little part of the value of the performance report lies in the fact that it is current. Reports issued for one shift are delivered on the same shift on the following regularly scheduled work day, thus providing factory supervisors with a constant timely check on the performance of the labor for which they are responsible. In addition to the daily reports, summary reports are issued weekly and monthly for factory management.

After completion of the daily performance report, labor job cards are forwarded to the payroll division where, together with the attendance cards, they are used in the preparation of the mechanical tabulations of labor distribution and payrolls for the period, to which earlier general reference has been made.

CONCLUSION

In this paper we have dealt with the broader aspects—and some detail—of the operation of the factory accounting system as related to labor time accounting and production reporting. Many refinements exist which are too detailed for discussion here. Rather, an attempt has been made to present a general understanding of the system, to point up its organization, the extent and character of control effected, and the application of mechanical accounting involved in it. The procedure is at the root both of labor cost control and production control and its presentation here may suggest to other companies possibilities of a like system, where it does not now exist, or of modifications in one now employed.

Production Control in a Small Foundry

by WINSTON BROOKE

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Many items, many orders, and a short production cycle characterize foundry operations and can quickly result in cumulative confusion unless there is a ready and reliable system of knowing how much of what is where and when it is wanted. A procedure to provide the answers to this multiple question is outlined by the author of this article.

THERE ARE MANY SMALL and medium size foundries in different sections of the country, which make standardized products—such as pipe fittings—and make them in a great many sizes and shapes and to many specifications. These foundries have a particularly interesting inventory and production control problem because of the very great variety of articles offered to the trade. It is natural for a manufacturer to over-burden himself with investment in inventory in an effort to satisfy customers with speedy shipments. Also to avoid shifting molders from one pattern to another and to minimize setup time of this highly paid labor classification, production problems are encountered, especially with small items, several of which may be molded simultaneously.

The system which will be described in this article is an attempt to provide a ready reference for four types of information which are very important to an efficiently run foundry and machine shop. Only that part of the process which leads to this information will be described. However, the reader will easily discern that the information which is used in this procedure can be correlated with and used in other accounting activities.

The four types of information, believed to underlie effective production control, are as follows:

1. Sales orders outstanding.
2. Expected yield from work in process.
3. Physical inventory.
4. Required production which, added to the existing inventory of completed and semifinished goods, will fill the sales orders outstanding, (or its counterpart, inventory available to fill future sales orders).

Steps to the System

The production control system here presented and the basic form which it uses, was designed for a two-register posting machine available at less than $1,500. This is mentioned because any person reviewing a proposed accounting

system which involves the use of office machinery, is anxious to learn the approximate additional investment in machinery necessary. As in any other case of proposed mechanization, a company contemplating the installation of a similar system will prefer to survey the field before selecting a particular machine.

The first step in building the system was the development of a pattern number system which would adequately cover some 5,000 variations of product which are listed in the company's catalogue and similar literature. In addition, there were specialized jobs to identify and it was, therefore, necessary to provide a block of numbers to be used for them. Thus there came into being a six-digit code to describe the various fittings, interpreted as follows:

Significance of digits—The first two digits were indicative of the name of the fitting, including variations in the basic design. The next three digits indicated size and the latter two the supplementary openings of that master size. The sixth digit was for variations of the type of joint represented. The number, nine, was used in each of these three parts of the code for products exceptional in any respect and referred to the reader to a written description.

Sample interpretation—As an example, Code No. 11-120-1 indicated a standard 90° "L," 1¼" by 1¼" by 1¼", screwed cast iron pipe fitting. Code No. 15-125-0 indicated a standard 45° "L" 1¼" by 1" by 1" with fine thread fittings.

Blocks of numbers—The basic or regular products used numbers between 10-000-0 and 59-999-9. The next block of numbers, starting with "6," was used for fittings for which the previous group was not particularly adaptable and the numbers above this were used for specialized castings and machine work jobs.

Production Control Card

At this point it is possible to initiate description of the system, itself. For each pattern number a card in the form shown in Exhibit 1 is maintained on the posting machine which has been mentioned. This card is eleven inches square in its full dimensions. Of the two registers on the machine, one is used to verify posting. The method of entry is characteristic of our situation and of the objectives of the system. Perhaps the procedure for the development of information can be best understood if the sample entries shown on Exhibit 1 are traced through.

Since all entries are quantities, it is necessary to ignore the decimal points. These have no place in this application of the machine.

Sales Order and Expected Yield Entries

On the receipt of a sales order an anticipated shipping date is applied. Then the various items on the order are coded by pattern number and the quantity to be produced on each is entered on a "unit" ticket. The tickets for all orders for the day or longer posting period are sorted by pattern numbers.

The use of the machine begins here. Postings from the tickets to the card result in entries like those in Exhibit 1. There it is assumed that this particular pattern had balanced out at the end of January. Sales order entries for February 1 and February 3 are shown. The reference number beside the dates is a

Pieces per Mold ..... Cores per Mold ..... Lbs. per Mold: Cast ..... Description E11, Std, 45d.1-1/8 x 1 x 1
Molds per Piece ..... Core Pattern No. ..... Scrap ..... Total ..... Pattern No. 151250

DATE	REFERENCE	WORK IN PROCESS			SALES ORDERS OUTSTANDING			Shipment		Production Necessary	Actual Inventory Balance 4+1-5
		Completed	Started	Balance 2+1-3	Orders	Shipments	Balance 4+4-5	Promised	Made	Available Inventory 7+4-8	
		Debit	Credit	Credit	Debit	Credit	Debit			Dr. Cr.	Debit
		1	2	3	4	5	6			7	8
Sales Orders											
Feb. 1	246.89				1.50		1.50	Feb 15		1.50	
Feb. 3	247.01				3.25		4.75	Feb 15		4.75	
Production Begun											
Feb. 10	60003.15		(5.40)	(5.40)						(.65)	
Production Completed											
Feb. 13		5.42		.02							5.42
Production Adjustment											
Feb. 14			(.02)							(.67)	
Shipment											
Feb. 15	48.97					(1.50)	3.25		Feb 15		3.92
Sales Order											
Feb. 15	253.27				1.00		4.25	Mar 1		.33	
Sales Order Cancelled											
Feb. 17	253.29				(.50)		3.75			(.17)	

EXHIBIT 1

numerical sequence number given to sales orders as they are received and enables anyone reviewing the production control card to check back to the name of the customer. The order quantities go in the first column of the "sales orders outstanding" section of the card and cumulatively in the third column (there being nothing at the moment to enter in the intervening or "shipments" column, and the promised shipment date column is entered for (say) February 15. The single column section, "production necessary," also gets these order quantities cumulatively, for there is no inventory to draw on, as the blank in the next (and final) column discloses.

Advice comes from the plant superintendent by way of a unit ticket that on February 10, 600 units were cast, out of which a yield of 540 units is expected. This anticipated yield is based on the foundry superintendent's knowl-

edge and experience. Since there is now work-in-process expected to yield 540 units and since the sales orders in hand call for 475 units, it can be seen that the company is in a position to accept orders for as many as 65 more units before putting through another production order for this item. Hence the appropriate figures are inserted on the card. The reference number corresponding to this "production begun" entry is a code representation of the gross units cast (600) and the number of the molder to whom this pattern was assigned (0315).

This is suggestive of further accounting uses of the information being compiled. For example, in most foundries the compensation of molders is based on piece-work. Consequently, the same production advice is serviceable for payroll and production control.

Production and Shipment Entries; Cancellations

On February 13 advice comes from the inspection department that 542 units of the pattern have been passed into inventory. It will be noted that the entry on the card for this item affects the work-in-process section and the actual inventory balance. It is apparent from the quantity completed that it represents all of the good castings to be expected from the order which has been in process and that something must be done for the two units shown as a work-in-process overage.

A production adjustment is initiated on the following day by the production control clerk after contacting the plant superintendent and being advised that there is no more work-in-process on this particular item. It will be noted that the production adjustment entry clears the work-in-process balance and adds to the inventory which is available to be used in filling future sales orders. It now becomes 67 castings. Had there been a shortage in the actual yield as compared with the anticipated yield—instead of an overage—the adjustment entry would have been in the opposite direction.

This method of effecting process adjustments works especially well with items which are cast in relatively small quantities and with respect to which there is normally no more than one production order in process at a time. The popular items will have overlapping production orders and, in these instances, it is necessary to take periodical physical inventories of the work-in-process and to make adjustments on the cards therefrom. These inventories need not be frequent if the foundry superintendent anticipates his yield with good judgment, since the overages will tend to offset the shortages.

The next entry on Exhibit 1, dated February 15, reflects shipment (Reference No. 4897, the sales invoice number) of 150 units, which has the effect of re-

ducing the sales orders outstanding and reducing the physical inventory but not inventory available for future sales orders. However, on the same date a sales order is received for 100 units, increasing sales orders outstanding and also converting the available inventory of 67 units into a production necessary figure of 33 units.

A further typical transaction appears on the card under date of February 17 when there is received from this customer a cancellation of one-half of his order. Production again becomes available inventory in the amount of 17 units.

Information—and Economy

The foregoing paragraphs have completed illustration of entries on the control card. There are two outstanding features of the production control plan which it embodies. One is the assembling on a single record of the basic factors on which production scheduling is based (physical inventory on hand, inventory in process, and sales orders outstanding) and the derivation of a single figure which immediately tells the exact minimum production necessary (or the exact quantity in inventory above immediate requirements). This information becomes very important when it is realized that many foundries producing finished goods for catalogue sales have a production cycle of a week or more. Since the manufacturer is also a merchant, minimum investment in inventory and maximum turnover are important matters to management.

The second outstanding feature of the system is the use of a two-register, low-priced posting machine to handle a job involving four balance columns. The machine can be installed without an expensive outlay. In fact, many companies could put the job on the machine which they are now using for accounts receivable posting.

THE WORKSHOP

The Cost Accountant Looks at Himself

by WILLIAM M. LEARY

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"And one man in his time plays many parts,
His acts being seven ages."—As You Like It.

WHEN SHAKESPEARE WROTE of the seven ages of man he was discussing physical age. The mental ages of a man are more numerous. In fact, it would appear certain that there are five such ages through which a man may pass just in his development as a cost accountant.

Unfortunately, the mental ages are not inevitable. Some cost accountants get through the first two or three but never reach the fourth or fifth. A description of each of the ages will show why it is so important to arrive at the final ages as quickly as possible. Identification of these ages may be difficult in individual cases because two or even three can be occurring at the same time. Or a man in one age may see the vision of the succeeding ages before he can attain them. The five ages are described here so that they may be distinguished and planned for by all who would achieve full development in the profession.

Illusion

Usually, after some acquaintance with double-entry bookkeeping, the cost accountant meets cost accounting technique. Either formally or informally, he learns about job costs. In illustrative examples he sees the schematic accuracy of the accumulation of costs by jobs, the apparent precision of the distributions of overhead. He comes to understand how unfailingly correct (it seems) are the bases for overhead distributions: floor space for rent, building and equipment values for insurance, number of employees for personnel costs, and on till all overhead is distributed. It becomes perfectly plain to him that departmental overhead can be determined with great nicety, and from there it is an easy step to determine the efficiency of the department's use of overhead.

Further techniques are revealed to the cost accountant in this initial age. For one, there are standard cost systems, unerringly pointing out causes of variations from predetermined standards. In addition, perhaps a thorough reading of texts, together with a little facility with a slide rule, discloses that the variations can be divided into subvariations and these into sub-sub-varia-

tions. It comes to seem certain that variations from standard can be made to yield every inkling of meaning by careful analysis.

If the cost accountant is genuinely interested in his work, is young, and has potentials in the field, this first age is one of irrepressibility, an age of exaltation. He admires his new tools excessively. What precision they promise! What infallible implements of analysis they seem! What an exact science has opened its doors to a new technician!

Disenchantment

In the second age technique is put to work, but the answers produced sometimes seem very odd. For one period it turns out that the description "Machining" on a man's time card really should have read "personal time." It becomes apparent likewise that the estimates used in allocating some overhead accounts are subject to debate.

As soon as doubts start to arise, they gain headway rapidly and induce the conclusion that all distribution of overhead is hocus-pocus. How readily it can then be seen that the fancy techniques are an attempt at refinement of what is pure dross to begin with. Why go to all this trouble just to produce inventory prices that will stand up under technical study, plus a lot of rather meaningless variations?

This is disenchantment indeed. Down from the clouds to earth where life is rough and tough and the cost figures do not fit the rules! Now the slide rule suddenly seems a tiresome gadget for use in dividing meaningless variations into meaningless sub-variations. Perhaps it would be better to get out and learn to dig a good workmanlike ditch.

Understanding

There is more to be hoped for from the third age. Now from exaltation and disillusionment comes a realistic understanding of cost accounting. In this age the cost accountant accepts it as simple fact that cost accounting systems have shortcomings and, in order to minimize these limitations, learns how to eliminate the "sports" from his figures. He realizes what a wealth of information is clearly available for appraisal of operations and his realization is properly tempered by the knowledge that the effectiveness of cost gathering and cost distribution systems must be considered when basing any conclusions on the cost data developed.

During this age much hard study and thought take place. It is here that there arises a growing apprehension that too little recognition is given to the cost reports. The cost accountant wonders if the higher-placed executives really understand them and make use of them. During this age the cost accountant, having real grasp of his own work but not yet having organizational entrée to the policy-determining group,

is likely to permit himself comments along colloquial lines, such as "What do they do with cost reports anyhow?" and "What's all the rush about?"

Here is the turning point. Is the cost accountant going to develop into real usefulness to himself, his company and the economy? Or is he going to get frozen at this level, with a fair amount of technical competence, a narrow view, and a large stock of standard "gripes"? A great deal depends on the decisions reached at this age, which may last for some time, and, because of the conflicting forces, may be an age of great inner turmoil. In fact, as has been indicated, the cost accountant may not ever break out of it. Only experience, deep thought, general development and a reasoned confidence in the value of cost accounting can bring him to the fourth age.

Participation

The transition to this age comes about through the use and application of costs with a breadth of comprehension which goes far beyond the routine approach of the merely accurate compiler of facts and yet includes a thorough knowledge of the difficulties and possible inaccuracies in compilation.

If this age is reached, we see a cost accountant who understands the need for accurate and early figures. He appreciates the variety of uses to which the cost reports may be put and studies and uses them—as he would have operating management do also—in developing solutions to future production and sales problems, problems of investment in equipment, and to all the parts of the company's business where they are helpful. He is alert to the development of studies to avoid dangers to his company, knows the break-even point and understands how to single out the really unprofitable lines.

Here is a full-fledged cost accountant. He can interpret costs to the other members of management. In many cases he can prevent unwise steps which would be taken if no one were on hand who had a thorough understanding of cost accounting. He permits no factually true, but inferentially misleading, cost reports to be used as a basis for company decisions.

Appreciation

The fifth age of a cost accountant is not brought about by increase in technical competence. It is the enlargement of the thinking of the cost accountant to the point at which he understands, appreciates, and enjoys the value of cost accounting to the economy as a whole and is glad to consider it his life work.

This involves a process of evaluation which may give trouble. It is easy to think of the value of a new polo shirt to the little boy across the street. It is less easy to think of cost accounting as a force which helps supply more things to more people. Yet

that is exactly what this fifth age realizes and enjoys. For if, through an understanding and use of costs, more people have more things for the same effort, a tangible value has been created, however difficult the intangible thinking about it may be.

At this point the cost accountant can lift himself out of overhead, in which classification he may always have feared he belonged. He becomes a definite factor in the improvement of productive output, a force in the income in things to many people and indirectly to all people in the country and perhaps beyond.

The Road Up

Any cost accountant who is admitted to the ranks in the first place should find no difficulty in arriving at age three. For further progress he must do his utmost. Age four is a broad stride from age three. A full use of his innate and acquired powers should bring many a cost accountant to age five. However, the "divine discontent" in this age is a finer state of emotion than a vegetable existence at a lower age could ever be.

The Cost Accountant Looks at His Company

by THOMAS D. FOY

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OBVIOUSLY, THE ACCOUNTANT is in an excellent position to make a definite and important contribution to his company's profitability. There are many ways he can do this.

Organization

First of all, the accountant must have an understanding of the basic principles of organization and know how they apply (and have been applied) in his company. These principles may be stated as follows:

1. **The purpose of organization** is to effect co-ordination, specialization, direction, and efficient use of human and material resources to achieve the objectives of the business.
2. **The basic problems of organization** are the establishment and maintenance of responsibility, accountability, authority, and morale.
3. **The characteristics of sound organization** are balance, stability, flexibility, simplicity, and high morale.
4. **Organization structure** is determined by the process through which control is exercised. It is modified according to the span of control, conceived of as the number of contacts between an executive and his subordinates with due regard for the degree of centralization desired.
5. **Factors affecting organization structure** include practically all items which affect the business as a whole.
6. **The processes of staffing and equipping** the organization are inseparable from planning the structure. Broad training and a varied background are desirable in an executive.
7. **The task of directing the organization is** the process which necessitates and utilizes a sound structure. All direction must be "through channels." Simplicity of structure, delegation of authority, dissemination of policy and information, and a streamlining of office procedures will solve many of the problems.

8. **Diagnosing an organization's performance** involves a study of its product, direction and control, and a study of the morale of its personnel. Aside from a periodic complete analysis by a staff man or specialist, diagnosis of performance is a continuous process. Every business concern, as time goes on, accumulates practices and habits which are out of line with contemporary needs. One of the most enlightened proponents of business administration has pointed out that these practices represent what was at one time a more or less satisfactory adaptation to some given situation. Business concerns, like individuals, once they develop a certain way of behaving, are likely to go on behaving that way long after the situation necessitating the mode of behavior has changed.

Substance of Operations

As a second prerequisite to effective service, the accountant must have a complete knowledge of all the functions of the business and how they are reflected in the organizational structure. He must have knowledge of the various departments or divisions, such as purchasing, production, manufacturing, sales, etc. and must understand and use in a discerning and realistic way, the latest technique of control with respect to expenses and budget comparisons or other operating data. He must be able to prepare and evaluate the reports required for management. He must stimulate the entire managerial organization continuously in a broad cost reduction program.

This activity will touch on many matters which might seem remote to the accountant's responsibility, but with respect to which a unifying force is needed. These matters include:

1. Simplification of organization.
2. Simplification and standardizing of routines.
3. Elimination of activities not profitable.
4. Improving methods.
5. Minimizing overtime payments unless they can be fully justified.
6. Establishing standards of performance.
7. Reducing maintenance costs.
8. Controlling use of small tools and supplies.
9. Conserving steam-electric energy, compressed air, water, gas, etc.
10. Controlling fixed charges.
11. Devising long and short term development programs.
12. Improving percentage of available business obtained.
13. Deciding on procedure for selection and development of personnel.
14. Taking effective cognizance of what constitutes good purchasing policy.
15. Regulating trends of product quality, scrap-losses, extra costs, customer complaints, etc.
16. Controlling purchases of fixed assets following appropriation approvals.

Accounting Department

As a third and final essential to performance—and by no means less important than the others—the accountant must operate his own organization efficiently and well. There are many steps that he can take to do so. Here are a few:

1. A complete and detailed personal knowledge of departmental functions. Development of flow and process charts to eliminate unneeded and unnecessary operations.
2. Establishment of a central file for use of all sections for general material. Filing of only one copy of material. Discontinuing the use of "letter books."
3. Setting up a central pool of personnel and equipment, from which sections can draw to meet peak demands. Elimina-

tion of private secretaries by use of central switchboard and pool of stenographic help.

4. Careful analysis of the uses of office machinery and equipment. (With increased labor rates for clerical personnel, office machinery of all kinds can perhaps indicate a saving; included are electric typewriters, tabulating or other sorting equipment, electric calculating and bookkeeping machinery, voice recording equipment, duplicating equipment, etc.)
5. Establishing a preventive maintenance of equipment program.
6. Providing the best possible working conditions in order to obtain maximum efficiency. (Involved here are good lighting, avoidance of excessive noise by using the many types of acoustical materials, arrangements for proper space planning and good office layout and selection of a pleasing color for office walls, since good colors can improve worker morale and reduce fatigue.)
7. Constantly checking that reports which are prepared are serving their respective purposes, and improvement of the form and types of reports and elimination of any which are duplications or out of date.

The accountant can make a tremendous contribution to efficient office operation and to management. The opportunities for outstanding service in these respects are limited only by his zeal and creative initiative.

Product Betterment

The organization and functions of the business and the operating details of his department are all matters of intimate concern to the accountant. Furthermore he should interest himself in the latest techniques of product quality control. A profitable business depends on a quality product and the accountant, as well as engineering, manufacturing and sales personnel, should foster the new methods of quality control both for customer acceptance and reduced manufacturing costs.

The Cost Accountant Looks at the Economy

by WALTER HARRISON

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IT WOULD BE WELL ON OCCASION for the cost accountant to look up from his daily routine details, gaze out of the window and consider his position objectively. It is generally recognized that the chief function of the cost department as a whole is the *collecting* of costs and that the more direct function of the cost accountant, on the other hand, is the *analyzing* of costs.

Can the cost accountant do justice to his job of analysis if he is buried in the mass of detail which is channelled to his department? Generally not. His first duty, therefore, is to free himself from the thousand and one relatively minor routine decisions which must be made. Among other things, he should delegate as much responsibility and authority to his subordinates as is practical. Little hope for growth can be expected from the cost accountant who will not willingly relinquish even the smallest bit of authority to his staff, guarding his prerogatives against all comers.

Facing Toward the Future

It is hoped that the thoughts expressed in this paper will help to awaken another type of cost accountant, including individuals who so far have not been able to see beyond the horizon of the department itself. There are the department heads who would change if they could but who seemingly are bogged down in the quagmire of routine details. There are many methods of simplifying routine, saving time, and eliminating unnecessary operations which the cost accountant can use to streamline his department and free himself for the more important analyses.

However, this freedom requires a broad view for proper use. Perhaps the greatest need is for the cost accountant to look ahead and to deal with the future as significantly as with the past, for the two are significantly related. These two seeming opposites have been tied in very neatly by Dr. Edwin G. Nourse, former economic advisor to the President, in counsel directed to accountants. Dr. Nourse said, "... your service is rendered best to your organization by looking relentlessly back through the superficial observations to what are the underlying conditions to see the problems before they hit too close to home."

There is also need to provide "spot" information. The qualified cost accountant has nothing to worry about so far as acknowledged day-to-day business is concerned. He can take that in his stride. His technical knowledge and experience are equal to the daily problems as ordinarily thought of. However, in a larger sense, it should be routine for the cost accountant to answer questions about situations which are *not* routine.

The World Outside

But beyond planning for the future in known terms and also beyond providing situation data at need, what of the still broader picture? The cost accountant understands individual cost systems but does he really know the economic system and how best to prepare the company for what may come in the next year or years? The cost accountant must not be caught napping when basic changes come.

What are some of the changes which are likely to take place in the near or distant future? It is not the intention here to gaze into a crystal ball. Rather, it is the objective to look back at well-established trends and to project those trends into probabilities of the future.

Management and Labor

One definite trend is that of freedom. Both labor and management have a road to travel to obtain complete freedom, each within its sphere, but the goal is infinitely closer to attainment than at any other time in recorded history. Can the cost accountant afford to keep his systems and reports so rigid and technical that he will be by-passed when labor and management

reach mutual and far-reaching decisions? Can he afford to hide behind familiar complex systems only to have them unrooted and discarded?

Simplicity will be one of the keywords of the future and the workingman has an uncanny ability to cut through red-tape and come up with amazingly simple answers to problems. The cost accountant will be on the spot unless he is at least *mentally* prepared to accept radical changes quickly and easily. Better still, if the appropriate changes in the form or substance of accounting are foreseen or suggested by the cost accountant, he will grow with and not after progress.

Lowered National Barriers

Again, foreign affairs do not lie beyond the field. Even a partial union of western nations in Europe would present a challenge to cost accountants. Leaders of American industry are already being asked (and the requests will continue) to provide advice and technical assistance to foreign countries. As technical know-how is one of the primary factors in this country's tremendous industrial success, the voluntary sharing of this knowledge with competitive nations will create problems of meeting competitive costs.

Higher protective tariffs are the first solution thought of. This solution is easy but will not always be available. As time goes on, the problem will confront us more and more. If economic boundaries and tariffs are eliminated, or rendered less important, industry must meet knowledge and skill and low costs with still lower costs. For the cost accountant and for American industry, the contest will be fascinating.

Another trend is quite likely to be an increasing number of foreign branches of American companies. For those accountants who are not yet familiar with procedures and methods of operating foreign branches, the possibility opens up new fields of thought and study.

Science and Invention

Then there are the always imminent and often drastic technological changes. Here we really find ourselves "looking back through superficial observations to the underlying conditions." Not too many years ago the brass industry owned hundreds of acres of woodland and engaged in lumbering operations because the heat-treating of brass required wood-fired furnaces. Now other types of fuel are used. The company with which I am connected found it necessary, in the heat-treating of steel, to build and operate its own gas-producing plant. Large-scale process change-overs inevitably bring cost problems but the cost accountant can contribute to their solution only if he is ready. He will be ready only if he has, in some measure at least, foreseen the change.

To continue the example, fuel can

easily be involved in the many changes which will occur in the future. For instance, news reports indicate that pipelines of natural gas are definitely being planned for New England. This poses immediate questions to be addressed to New England accountants. Have you kept up with your engineering or research departments in investigating the elements of costs in using natural gas for heating and manufacturing operations? Does the saving in gas cost offset the expense of converting equipment? The answers cannot be known without investigation. The cost accountant should not miss. The job is a "natural" to him.

The same principle applies to some aspects of atomic energy. It may be thought that this is going too far into the future. However, a list published late in 1948 names a dozen or more companies which deal in isotopes, counters, film badges, and other products relating to nuclear fission. They are the forerunners of a vast future industry, just as the first garages helped to usher in the automotive era. Research in the use of isotopes has already begun in the textile industry, the paint industry, and the steel industry. With wide-awake manufacturing concerns rapidly taking advantage of new developments, practically all of the products of American industry will be affected in some way by the use of atomic energy or its by-products in much less time than might be supposed.

Freedom from Detail

In short, the cost accountant should study, develop, and utilize time-saving ideas and methods in order to streamline his department. He should train his staff to make routine decisions. Above all, he should delegate some responsibility and authority to members of his staff. By doing this he frees himself for the more valuable task of cost analysis. Being free of routine details, he is also in a position to broaden his outlook and to consider new developments which are beyond the confines of his department.

We are in changing times. A study of basic economic and social trends will enable him to forecast to some extent the over-all changes which may take place in the future. In this respect, the growing importance of labor in partnership with management may necessitate alterations in cost systems and methods. Of equal importance is the possibility of political unification between nations, which may eliminate tariffs and protective duties. Cost reduction would then be a paramount necessity. In the industrial field, technical advances, especially the use of new fuels, will affect cost. This is particularly true of the by-products of research in atomic energy.

Contemplation of those potential changes will assist the cost accountant in enlarging his mental scope, thereby making him more valuable to his company and to himself.

Coming Articles IN THE **N.A.C.A. Bulletin,** MAY, 1951

Improving the Office Product and Operations
by CARL E. LINDQUIST

Good Procedures Are a Practical Matter
by ROBERT BROATCH, JR.

Conference Method to Formulate Procedures
by HOWARD PALLENZ

A Group Incentive Plan for the Office
by OLIVER R. ALTUM

When Does Part of the Business Break Even?
by RAYMOND J. BARBER, JR.

Fire Damage and Business Interruption Claim Problems
by JOSEPH F. SULLIVAN

A Contractor's Records for Construction Equipment
by WILLIAM D. HAMILTON

THE COST FORUM

ACCOUNTING CONTROLS FOR "CONTRACT MAINTENANCE"

Editor, N. A. C. A. Bulletin:

BECAUSE COSTLY OVERHEAD and standby charges can be incurred in staffing adequate and skilled labor crews to perform maintenance work of a periodic rather than a continuous nature, the possibility for substantial savings exists in contracting such maintenance work to independent firms on a cost-plus basis. There has been a trend in this direction in the petroleum refining industry, as the periodic "blow-downs" of intricate distillation, cracking and other petroleum processing facilities or units are of considerable magnitude and require the utilization of large crews involving a number of skilled crafts. Procedures followed in an oil company which contracts substantially all of its refinery maintenance work to others on such a cost-plus basis, are outlined herein. The procedures provide an adequate check of performance as a basis for making payments and required accounting distributions.

The principal provisions of the contracts under which the work is performed are as follows:

1. Contractor provides labor, direct supervision, materials at option of the owner, and mechanical equipment not available from owner, all work to be performed as directed by the owner's representatives.
2. Wage rates by crafts and classifications are specified, together with bases for changes in event of wage increases.
3. The percentage of labor for profit, and the nature of the items contemplated by such percentage, are set forth.
4. Rental rates for equipment are stated.
5. Specific provisions are made with respect to taxes, insurance and other items.

The owner provides the contractor with a daily time distribution sheet designed principally for the reporting of the contractor's field labor but the form is also used as a memorandum for reporting rental charges. Material delivered by the contractor is noted on a form provided by him. All forms are prepared in triplicate. Each day the contractor's foremen for the respective craft groups prepare the material and rental sheets and the time sheets which enumerate the names of contractor's employees, payroll rate, classification, shift period, time worked, and job worked on.

These sheets are then turned over to the owner's foremen. The latter, who function as inspectors and general supervisors and who are in direct touch with work going on in their particular area of responsibility, examine the contractor's daily reports in detail, checking them against their records made from personal observation of the men working, the time worked, and the character of the work performed, rental equipment in use, materials supplied, pay and rental rates, etc. If such reports are in order, the owner's foremen sign in approval, the originals being sent to the accounting office, duplicates to the contractor and triplicate retained.

Each of the contractor's foremen forwards his copy of the daily charges to his own office which uses it as a basis for payroll and invoice preparation and as a means for account distribution to owner's job orders. Periodically, usually semi-monthly, the contractor submits an invoice to the owner for total charges to date. These charges are supported by a copy of the contractor's payroll and a list of ma-

terial supplied. The owner's accounting office checks such invoices against their own approved copies of the daily charges and against the general terms of the contract. If correct, the invoices are approved for payment. The contractor's charges against job orders are accumulated currently by him but are submitted only monthly to the owner's office. The total distribution must reconcile with the total of invoices for that month. Test checks of contractor's distribution of charges to job orders are made periodically to promote accuracy.

When the unavoidable errors and omissions mend their furtive ways (despite the watchfulness provided for by the procedures), they must be arrested and arraigned for trial. To illustrate, if a time sheet shows the well-known Joe Doakes to have worked 4 hours at $3 an hour, but the invoice discloses a charge (supported by payroll) of 8 hours at $2 per hour, reference would be made to the contract to substantiate the rate as approved. A letter would then be addressed to the contractor, with copy to owner's foreman, stating the rate specified in the contract and also time for which approval had been received. The foremen of the contractor and owner are required to straighten out the inconsistency and prepare new and approved correction sheets and to route them on the same journey as the originals.

Here, in effect, has been established a procedure by which the owner's field representatives have personally observed and approved each field expenditure on the contractor's invoice. The owner's accounting office has confirmed all rates for direct charges and has reconciled all nonfield type items with the contract. Finally, the owner's internal auditor periodically reviews the contractor's records with reference to all phases of the contract.

L. L. SWEET, *Los Angeles Chapter*

THE ROBINSON-PATMAN ACT AND PRICING TO MEET COMPETITION

Editor, N. A. C. A. Bulletin:

SOMETHING NEW has recently been added to an old and troublesome subject. As background, reference may be made to the November, 1949 issue of the *Bulletin* in which Professor Heckert's outstanding article, "Coverage and Cost Provisions of the Robinson-Patman Act", appeared. In discussing exceptions, under which a price differential is permitted, Professor Heckert made the following statement:

> ". . . a price discrimination *may* be justified, even if all the conditions usually prohibitive of such action are present, when it is shown that the lower price was made in good faith to meet an equally low price of a competitor or the services or facilities furnished by a competitor. This particular justification is found, not in Subsection (a) with the others, but in Subsection (b), the section which relates to proceedings before the Federal Trade Commission. Whether or not this justification constitutes a complete defense against a prima facie case of discrimination has not been finally determined. Indications are, however, that the proviso cannot be relied upon as a complete defense. The *Standard Oil* case, now pending in the U. S. Supreme Court, should settle this point."

As the Supreme Court has now rendered a decision in this case, it is interesting to see how this exception to the law was treated. At the time Professor Heckert wrote his article, the Circuit Court of Appeals, Judge Minton presiding, had ruled in favor of the Federal Trade Commission in a decision which substantially limited the defense available through showing that a price has the effect of meeting a competitor's lower price. The Standard Oil Company of Indiana appealed the decision to the Supreme Court. In a 5-3 decision rendered January 8, 1951, the court re-

versed the decision of the lower court and held that under the Robinson-Patman Act, it is a complete defense that price reduction is made in good faith to meet a lawful equally low price of a competitor.

The majority opinion, written by Justice Burton, gives a clear statement of the logic used in reaching the decision and includes an interesting reference to the effect of reduced sales on unit costs. Pertinent excerpts from the opinion may be quoted as follows:

> "The heart of our national economic policy long has been faith in the name of competition. . . . Congress did not seek by the Robinson-Patman Act either to abolish competition or so radically to curtail it that a seller would have no substantial right of self-defense against a price paid by a competitor. . . . If a large customer requests his seller to meet a temptingly lower price offered to him by one of his seller's competitors, the seller may well find it essential, as a matter of business survival, to meet that price rather than to lose the customer. . . . There is nothing to show a congressional purpose, in such a situation, to compel the seller to choose only between ruinously cutting its prices to all its customers to match the price offered to one, or refusing to meet the competitor and then ruinously raising its prices to its remaining customers to cover increased unit costs. There is, on the other hand, plain language and established practice which permits a seller through Section 2 (b), to retain a customer by realistically meeting in good faith the price offered to that customer, without necessarily changing the seller's price to its other customers."

Although this decision appears to uphold the contention that showing a lower price to have been made in good faith to meet an equally low price of a competitor, constitutes a complete defense under the Robinson-Patman Act, it should be pointed out that three Justices dissented and a fourth, Justice Minton, did not take part in the case as he had written the decision in the lower court before his appointment to the Supreme Court. It was his decision which the dissenting justices upheld. These justices stated in the minority opinion, written by Justice Reed:

> "The underlying congressional purpose to curtail methods of avoiding limitations on price discriminations . . . satisfies us that we should adopt the conclusion of the Commission and the Court of Appeals. We believe that good faith meeting of a competitor's price only rebuts the prima facie case of violation established by showing the price discrimination. Whether the proven price discrimination is of a character that violates Section 2 (a) then becomes a matter for the determination of the Commission on a showing that there may be injury to competition."

It appears from the decision in this case that the limitations which Professor Heckert mentioned in his article may not be as serious as he anticipated from the decision of the Circuit Court of Appeals. However, the split of the court would indicate that it may still be dangerous to rely on the good faith meeting of a competitor's price as a complete defense under the Robinson-Patman Act.

JOHN T. WHEELER, *Twin Cities Chapter*

DOES THE COST DEPARTMENT HAVE RELIABLE ACTUAL COSTS?

Editor, N. A. C. A. Bulletin:

A GREAT DEAL has been written and said regarding increased benefits that can be obtained from a cost system which is correlated with the general books. It is almost universally recognized that the general accountant should outline the methods to accomplish this objective. However, do cost accountants recognize their duty to learn enough about general accounting routines to integrate the cost system with the general records? In many cases, it has

been a one-sided matter. This can play havoc with cost results whatever the system.

I have in mind a manufacturing company in which the cost department is segregated from general accounting and is relatively large. The general accountant is fully occupied with coordination of accounting work with all departments of the business. The company has adopted standard costs and the cost department accumulates actual costs for comparison therewith.

Actual costs of materials are calculated from copies of invoices sent directly to the cost section from the purchasing department, a separate copy being forwarded to the accounts payable section. The supervisor of the cost department records, probably accurately, the invoices that come to his desk. However, he does not undertake to determine that he obtains a copy of each invoice recorded in the voucher register. Substantially the same condition obtains in accumulating other elements of cost.

This absence of tie-in of actual costs between the records of the two departments creates uncertainties and inaccuracies. The inventory accounts are relieved at standard cost plus variance on finished product shipped. (There is seldom a stock of finished units on hand.) Frequently, the general accountant will note, based on his knowledge of the plant, that the inventory book balance appears markedly too high or too low. The year-end physical inventory is likely to disclose a large variation from recorded balances. So far, the remedy applied has been arbitrary adjustment of variances for approximate reconciliation. Nobody knows what losses may be "buried" by this procedure.

Is the cost department doing its job in such a case? The odd part about this condition is that it frequently occurs and can be traced, I belive, directly to the fact that cost accountants do not accept as their responsibility the absolute need to coordinate the cost system with the general accounts. In my opinion, the tie-in should be formally prescribed as a minimum requirement for *any* cost system.

JAMES J. BROPHY, *Dallas Chapter*

COMPETITION IS THE LIFE OF EFFICIENCY

Editor, N. A. C. A. Bulletin:

AT A PLANT with which I was associated we had difficulty in getting the significance of our cost reports across to the foremen. Most of them were craftsmen or technicians and figures did not mean much to them. For a long time we prepared weekly reports for them, showing the performance records of their respective departments. The figures on these reports took a great many hours to compile and were presented to the foremen in the usual form in dollars and cents and percentages of gain or loss. These summaries were usually accepted in an offhand manner, casually glanced at, then placed in a drawer. Most of the red figures continued to be red and the general picture failed to show much improvement. Clearly, the time and effort spent in preparing the reports were not paying much by way of dividends.

Someone proposed that the performance data be shown in graphic rather than in report form. A graph portraying the identical information in summary form was drawn up and posted in each department. Each week the performance figure for the department was indicated on the graph and the trend shown by a connecting line. Duplicates of the departmental graphs were also posted as a group on the wall of the superintendent's office.

The effect was electrifying. Men who were formerly entirely phlegmatic concerning reports given them, became extremely

sensitive to the fluctuations of the graphs pertaining to their respective departments. When the trend line took a dip, they immediately called the cost department to find out where the trouble spots were. The time study man found himself in much greater demand by foremen who wanted as many jobs as possible put on an incentive rate. Moreover, the charts in the superintendent's office were carefully watched by all supervisory personnel, who wanted to know how they were making out in comparison with their associates.

As a result, the performance records, which were still compiled in detail for top management and were the basis for the consolidated figures on the graphs, showed a continuing improvement. Many operations formerly in the red changed to black. The reasons for this are not difficult to understand. Each foreman is a busy man with many varied responsibilities to attend to. The typewritten performance record was to him simply another report among the many papers which came across his desk each day. However, the graph presented a sharply-etched picture. It was simple to understand. The trend of operating efficiency could be seen at a glance. Further, the graph, as posted on the wall, could not be put away in a drawer but was displayed where the foreman saw it several times daily.

However, I believe the chief reason for success of the graphic presentation was its appeal to the foreman's pride and competitive spirit. His ability as a manager was being publicly measured and recognized. Also, the graphs of all departments posted side by side in the superintendent's office made a contest out of the effort to be a good executive. Everyone wanted to have the highest efficiency line. No one wanted to have the lowest. The results of this competition were extremely beneficial to the company in the form of higher supervisory morale, increased production, and lowered costs.

LAWRENCE B. KENNY, *Providence Chapter*